BACK

Keston

System 30

Installation and Servicing Instructions

FAN POWERED HIGH EFFICIENCY
MODULATING DOMESTIC CONDENSING
GAS COMBINATION BOILER

CE/PI No. 86-CL-08
System 30 - GC No. 41-930-39

CE

These instructions must be left either with the user or next to the site gas meter.

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COMPLIANT WITH BUILDING REGULATION PART L1 & L2

SEDBUK A RATED

benchmark

NOTES FOR THE INSTALLER

FOR ANY TECHNICAL QUERIES PLESE RING THE KESTON INSTALLER/TECHNICAL HELPLINE : 01482 443005

NOTE. BOILER RESET PROCEDURE -
To reset boiler, turn mode knob to reset position and immediately turn knob back to required setting.
The boiler will repeat the ignition sequence if a heat demand is present.

DOCUMENT AMENDMENTS

Relevant Installation changes implemented in this book from Mod Level ..... A01 (Oct 12)

GENERAL

Table 1 - General Data

Keston System			**30**
Gas supply			2H - G20 - 20mbar
Gas Supply Connection			15mm copper compression
Injector Size		(mm)	4.65
Flow Connection		Central Heating	22mm copper compression
Return Connection		Central Heating	22mm copper compression
Flue Terminal Diameter		mm (in)	50 (2)
Average Flue Temp-Mass Flow Rate			69°C - 13g/s
Maximum Working Pressure (Sealed Systems)		bar (lb/in^2)	2.5 (36.3)
Electrical Supply			230 V ~ 50 Hz.
Power Consumption		W	152
Fuse Rating			External : 3A Internal : T4H HRC L250 V
Water content		litre (gal)	1.2 (0.26)
Packaged Weight		kg (lb)	34.5 (76)
Maximum Installation Weight		kg (lb)	28 (61.7)
Boiler Casing Size	Height	mm (in)	700 (27.5)
	Width	mm (in)	395 (15.5)
	Depth	mm (in)	278 (11)

Table 2 - Performance Data - Central Heating

			30	
			MIN	MAX
Boiler Input :				
Boiler Input 'Q'	Nett CV	kW	6.1	30.4
		(Btu/h)	(20,700)	(103.600)
	Gross CV	kW	6.7	33.7
		(Btu/h)	(23,000)	(115,000)
Gas Consumption		m^3/h	0.622	3.135
		(ft^3/h)	(22)	(111)
Boiler Output :				
Non Condensing	kW		6.1	30.3
70°C Mean Water temp.		(Btu/h)	(20,700)	(103,300)
Condensing		kW	6.4	31.0
40°C Mean Water temp.		(Btu/h)	(21,800)	(105,800)
Seasonal efficiency* SEDBUK 2005			91.1%	
Seasonal efficiency* SEDBUK 2009			89.6%	
NOx Classification			CLASS 5	

* The value is used in the UK Government's Standard Assessment Procedure (SAP) for energy rating of dwellings. The test data from which it has been calculated have been certified by a notified body.

Note. *Gas consumption is calculated using a calorific value of 38.7 MJ/m^3 (1038 Btu/ft^3) gross or 34.9 MJ/m^3 (935 Btu/ft^3) nett*

To obtain the gas consumption at a different calorific value:

a. ***For l/s*** *- divide the gross heat input (kW) by the gross C.V. of the gas (MJ/m^3)*

b. ***For ft^3/h*** *- divide the gross heat input (Btu/h) by the gross C.V. of the gas (Btu/ft^3)*

c. ***For m^3/h*** *- multiply l/s by 3.6.*

Key to symbols

GB = United Kingdom **IE** = Ireland (Countries of destination)

PMS = Maximum operating pressure of water

C_{13} C_{53} = A room sealed appliance designed for connection via ducts to a horizontal terminal, which admits fresh air to the burner and discharges the products of combustion to the outside. The fan is up stream of the combustion chamber.

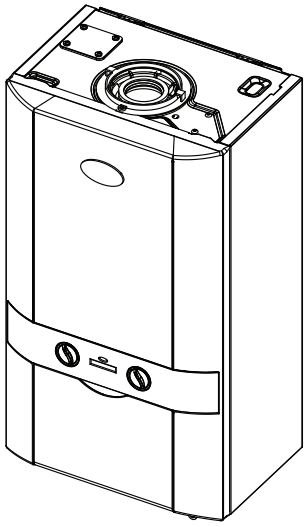
I_{2H} = An appliance designed for use on 2nd Family gas, Group H only.

Keston System

Natural Gas only

Boiler size	G.C. Appliance No. (Benchmark No.)	PI No.
30	41-930-39	86 CL 08

Destination Country: GB, IE



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For GB, to comply with Building Regulations Part L1 (Part 6 in Scotland) the boiler should be fitted in accordance with the manufacturer's instructions. Self-certification that the boiler has been installed to comply with Building Regulations can be demonstrated by completing and signing the Benchmark Commissioning Checklist.

Before installing this boiler, read the Code of Practice sheet at the rear of this book.

BENCHMARK COMMISSIONING CHECKLIST DETAILS

Boiler	**Page**
Make and model	5
Appliance serial no. on data badge	Front Cover
SEDBUK No. %	4
Controls	
Time and temperature control to heating	28
Time and temperature control to hot water	N/A
Heating zone valves	28
TRV's	8
Auto bypass	8
Boiler interlock	8
For	**all boilers**
Flushing to BS.7593	12
Inhibitor	12
Central heating mode	
Heat input	to be calculated
Burner operating pressure	n/a
Central heating flow temp.	measure and record
Central heating return temp.	measure and record
For combination boilers only	
Scale reducer	11
Hot water mode	
Heat input	to be calculated
Max. operating burner pressure	n/a
Max. operating water pressure	measure & record
Cold water inlet temp	measure & record
Hot water outlet temp.	measure & record
Water flow rate at max. setting	measure & record
For condensing boilers only	
Condensate drain	21,22
For all boilers:	*complete, sign & hand over to customer*

For assistance see Technical Helpline on the back page

NOTE TO THE INSTALLER: COMPLETE THE BENCHMARK COMMISSIONING CHECKLIST AND LEAVE THESE INSTRUCTIONS WITH APPLIANCE

benchmark
COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

INTRODUCTION

The **Keston System** boiler is wall mounted, full sequence, automatic spark ignition, low water content, fanned flue, high efficiency, condensing, system gas boiler.

Note. *Due to the high efficiency of the boiler a plume of water vapour will form at the flue terminal during operation.*

Central heating (CH) output is fully modulating with a range of:

30 6.1 to 30.3kW (20,700 to 103,300 Btu/h)

The boiler is supplied fully assembled with circulating pump, pressure gauge, safety valve and CH expansion vessel.

A variable CH temperature control is fitted on the user control.

The boiler includes as standard:
- Boiler frost protection
- Daily pump exercise
- Weather compensation

The boiler casing is of white painted mild steel.

The boiler temperature control is visibly located in the control panel on the front of the boiler.

The heat exchanger is manufactured from cast aluminium.

The boiler is suitable for connection to fully pumped, sealed heating systems ONLY. Adequate arrangements for completely draining the system by provision of drain cocks MUST be provided in the installation pipework.

Pipework from the boiler is routed downwards.

OPERATION

When there is a demand for CH, the heating system is supplied at the selected temperature of between 30°C and 80°C.

The boiler features a comprehensive diagnostic system which gives detailed information on the boiler status when operating, and performance of key components to aid commissioning and fault finding.

SAFE HANDLING

This boiler may require 2 or more operatives to move it to its installation site, remove it from its packaging base and during movement into its installation location. Manoeuvring the boiler may include the use of a sack truck and involve lifting, pushing and pulling.

Caution should be exercised during these operations.

Operatives should be knowledgeable in handling techniques when performing these tasks and the following precautions should be considered:

- Grip the boiler at the base.
- Be physically capable.
- Use personal protective equipment as appropriate, e.g. gloves, safety footwear.

During all manoeuvres and handling actions, every attempt should be made to ensure the following unless unavoidable and/or the weight is light.

- Keep back straight.
- Avoid twisting at the waist.
- Avoid upper body/top heavy bending.
- Always grip with the palm of the hand.
- Use designated hand holds.
- Keep load as close to the body as possible.
- Always use assistance if required.

OPTIONAL EXTRA KITS

- Air Terminal Finishing Kit
- Chronotherm Room Controller
- Flue Sleeve Kit
- Room Sensor

SAFETY

Current Gas Safety (installation and use) regulations or rules in force:

The appliance is suitable only for installation in GB and IE and should be installed in accordance with the rules in force.

In GB, the installation must be carried out by a Gas Safe Registered Engineer. It must be carried out in accordance with the relevant requirements of the:

- Gas Safety (Installation and Use) Regulations
- The appropriate Building Regulations either The Building Regulations, The Building Regulations (Scotland), Building Regulations (Northern Ireland).
- The Water Fittings Regulations or Water byelaws in Scotland.
- The Current I.E.E. Wiring Regulations.

Where no specific instructions are given, reference should be made to the relevant British Standard Code of Practice.

In IE, the installation must be carried out by a Registered Gas Installer (RGII) and installed in accordance with the current edition of I.S.813 “Domestic Gas Installations”, the current Building Regulations and reference should be made to the current ETCI rules for electrical installation.

Detailed recommendations are contained in the following British Standard Codes of Practice:

BS. 5440:1 Flues (for gas appliances of rated input not exceeding 70 kW).

BS. 5440:2 Ventilation (for gas appliances of rated input not exceeding 70 kW).

BSEN. 12828:2003 Heating Systems in buildings: Design for water based heating systems.

BSEN 12831:2003 Heating Systems in buildings: Method for calculation of the design heat load.

BSEN 14336:2004 Heating Systems in buildings: Installation and commissioning of water based heating systems.

BS. 5546 Installation of gas hot water supplies for domestic purposes (2nd Family Gases)

BS. 6798 Installation of gas fired hot water boilers of rated input not exceeding 70 kW.

BS. 6891 Low pressure installation pipes.

Health & Safety Document No. 635.

The Electricity at Work Regulations, 1989.

The manufacturer’s notes must NOT be taken, in any way, as overriding statutory obligations.

IMPORTANT. These appliances are CE certificated for safety and performance. It is, therefore, important that no external control devices, e.g. flue dampers, economisers etc., are directly connected to these appliances unless covered by these Installation and Servicing Instructions or as otherwise recommended by **Keston** in writing. If in doubt please enquire.

Any direct connection of a control device not approved by **Keston** could invalidate the certification and the normal appliance warranty. It could also infringe the Gas Safety Regulations and the above regulations.

SAFE HANDLING OF SUBSTANCES

No asbestos, mercury or CFCs are included in any part of the boiler or its manufacture.

LOCATION OF BOILER

The boiler must be installed on a flat and vertical internal wall, capable of adequately supporting the weight of the boiler and any ancillary equipment.

The boiler may be fitted on a combustible wall and insulation between the wall and the boiler is not necessary, unless required by the local authority.

For electrical safety reasons there must be no access available from the back of the boiler.

The boiler must not be fitted outside.

Timber Framed Buildings

If the boiler is to be fitted in a timber framed building it should be fitted in accordance with the Institute of Gas Engineering document IGE/UP/7:1998.

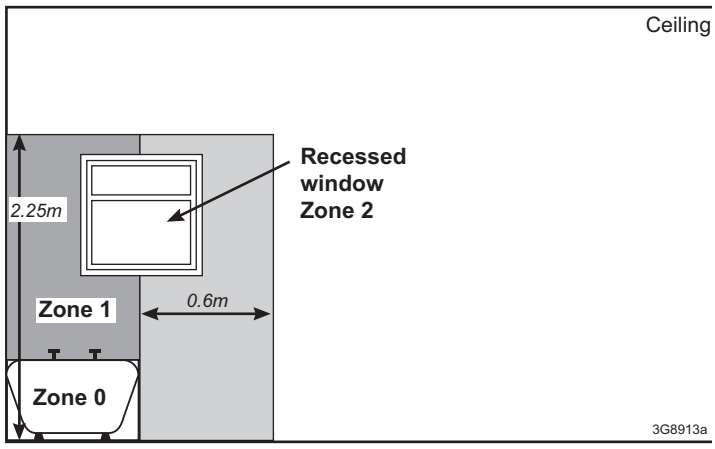
Bathroom Installations

This appliance is rated **IP20.**

The boiler may be installed in any room or internal space, although particular attention is drawn to the requirements of the current IEE (BS.7671) Wiring Regulations and the electrical provisions of the building regulations applicable in Scotland, with respect to the installation of the boiler in a room or internal space containing a bath or shower. For IE reference should be made to the current ETCI rules for electrical installations and I.S. 813:2002.

If the appliance is to be installed in a room containing a bath or shower then, providing water jets are not going to be used for cleaning purposes (as in communal baths/showers), the appliance must be installed beyond Zone 2, as detailed in BS.7671.

Compartment Installations



A compartment used to enclose the boiler should be designed and constructed specially for this purpose.

An existing cupboard or compartment may be used, provided that it is modified for the purpose.

In both cases, details of essential features of cupboard / compartment design, including airing cupboard installation, are to conform to the following:

- BS 6798 (No cupboard ventilation is required - see ‘Air Supply’ for details).
- The position selected for installation MUST allow adequate space for servicing in front of the boiler.
- For the minimum clearances required for safety and subsequent service, see the wall mounting template and Frame 1. In addition, sufficient space may be required to allow lifting access to the wall mounting plate.

GAS SUPPLY

The local gas supplier should be consulted, at the installation planning stage, in order to establish the availability of an adequate supply of gas. An existing service pipe must NOT be used without prior consultation with the local gas supplier.

The boiler MUST be installed on a gas supply with a governed meter only.

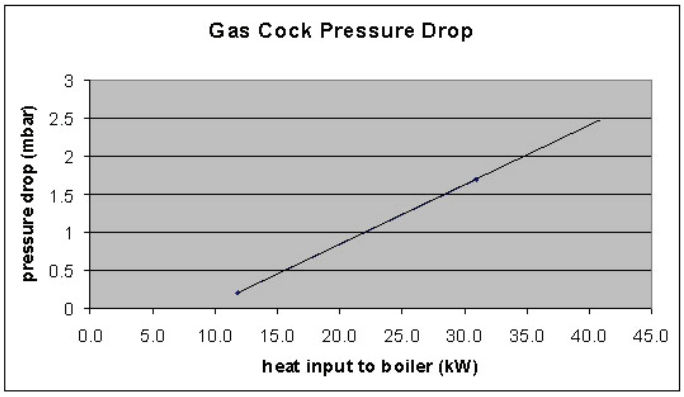
A gas meter can only be connected by the local gas supplier or by a Gas Safe Registered Engineer. In IE by a Registered Gas Installer (RGII).

An existing meter should be checked, preferably by the gas supplier, to ensure that the meter is adequate to deal with the rate of gas supply required.

It is the responsibility of the Gas Installer to size the gas installation pipework in accordance with BS6891:2005. Whilst the principle of the 1:1 gas valve ensures the Keston range is able to deliver it's full output at inlet pressures as low as 14mb, other gas appliances in the property may not be as tolerant. When operating pressures are found to be below the minimum meter outlet of 19mb these should be checked to ensure this is adequate for correct and safe operation.

Allowing for the acceptable pressure loss of 1mb across the installation pipework, it can be assumed that a minimum permitted operating pressure of 18mb will be delivered to the inlet of the appliance. (Reference BS 6400-1 Clause 6.2 Pressure Absorption).

The external gas cock could further reduce the operating pressure when measured at its test point. The pressure drop is relative to the heat input to the boiler (kW), refer to graph below.



IMPORTANT.

Installation pipes must be fitted in accordance with BS.6891. In IE refer to IS.813:2002.

The complete installation MUST be tested for gas tightness and purged as described in the above code.

WATER CIRCULATION SYSTEM

IMPORTANT.

A minimum length of 1 metre of copper pipe MUST be fitted to both flow and return connections from the boiler before connection to any plastic piping.

The central heating system should be in accordance with BS.6798 and, in addition, for smallbore and microbore systems, BS.5449.

WATER TREATMENT - see Frame 4

BOILER CONTROL INTERLOCKS

Central heating systems controls should be installed to ensure the boiler is switched off when there is no demand for heating, in compliance with Building Regulations.

Heating systems utilising full thermostatic radiator valve control of temperature in individual rooms should also be fitted with a room thermostat controlling the temperature in a space served by radiators not fitted with such a valve.

When thermostatic radiator valves are used, the space heating temperature control over a living / dining area or hallway having a heating requirement of at least 10% of the minimum boiler heat output should be achieved using a room thermostat, whilst other rooms are individually controlled by thermostatic radiator valves. However, if the system employs thermostatic radiator valves on all radiators, or two port valves, then a bypass circuit must be fitted with an automatic bypass valve to ensure a flow of water should all valves be in the closed position.

ELECTRICAL SUPPLY

WARNING.

This appliance must be earthed.

Wiring external to the appliance MUST be in accordance with the current I.E.E. (BS.7671) Wiring Regulations and any local regulations which apply. For IE reference should be made to the current ETCI rules for electrical installations.

The mains supply to the boiler and system wiring centre shall be through one common fused double pole isolator. For new heating systems, and where practicable replacement boiler installations, the isolator shall be situated adjacent to the appliance.

CONDENSATE DRAIN

Refer to Frames 20, 21 & 41

A condensate drain is provided on the boiler. This drain must be connected to a drainage point on site. All pipework and fittings in the condensate drainage system MUST be made of plastic - *no other materials may be used.*

IMPORTANT.

Any external runs must be in accordance with BS 6798.

The drain outlet on the boiler is sized for standard 21.5mm (3/4") overflow pipe. It is a universal fitting to allow use of different brands of pipework.

1 BOILER DIMENSIONS, SERVICES & CLEARANCES

all dimensions in mm

The boiler connections are made on the boiler connection tails. Refer to Frame 23.

The following minimum clearances must be maintained for operation and servicing.

Additional space will be required for installation, depending upon site conditions.

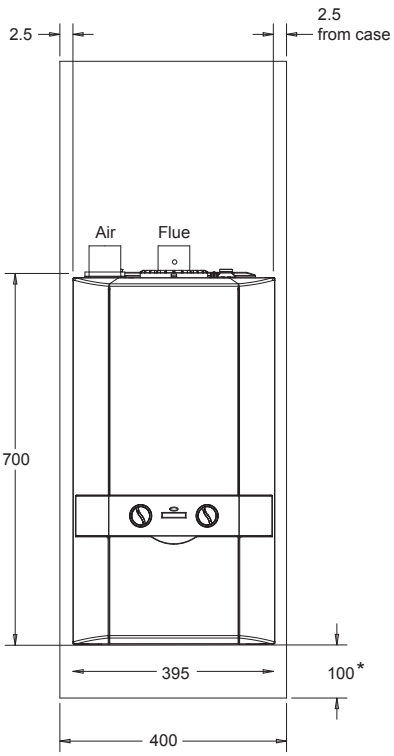
Side and Rear Flue

a. Provided that the flue hole is cut accurately, e.g. with a core drill, the flue can be installed from inside the building where wall thicknesses do not exceed 600mm (24”). Where the space into which the boiler is going to be installed is less than the length of flue required the flue must be fitted from the outside.

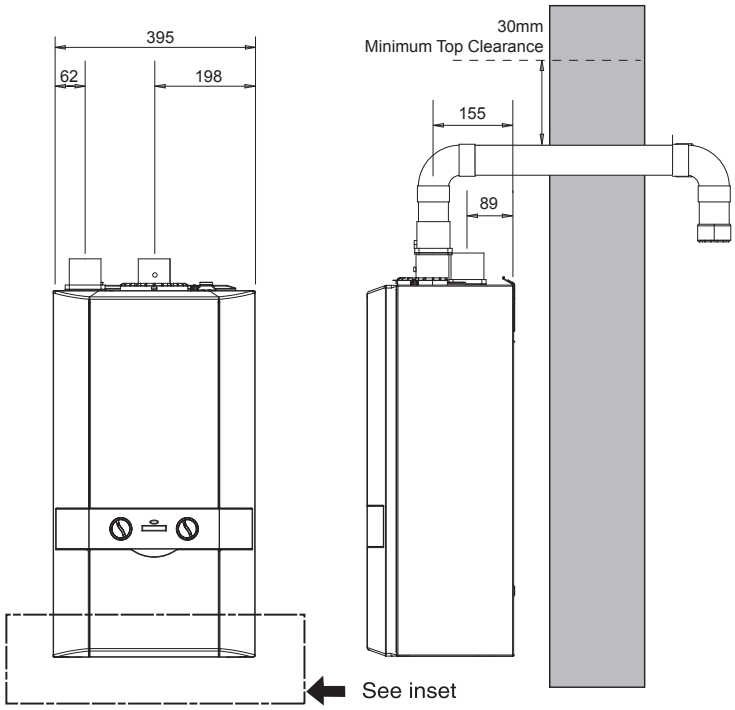
Installation from inside ONLY

b. If a core boring tool is to be used inside the building the space in which the boiler is to be installed must be at least wide enough to accommodate the tool.

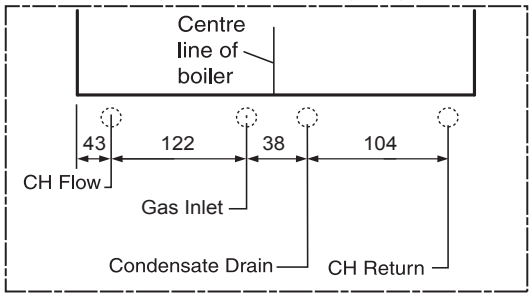
CLEARANCES

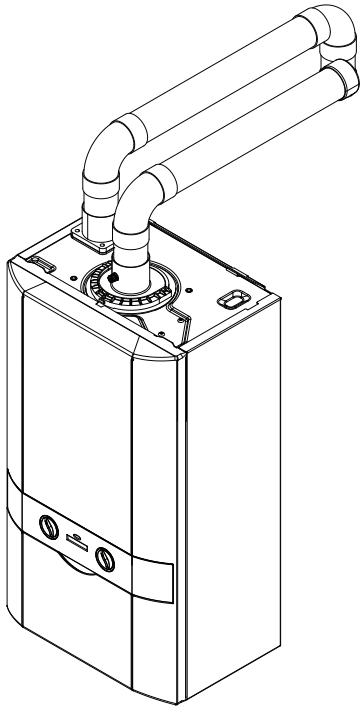


BOILER DIMENSIONS



Inset: Water Connections and Gas Connection





Front clearance

The minimum front clearance when built in to a cupboard is 5mm from the cupboard door but 450mm overall clearance is still required, with the cupboard door open, to allow for servicing.

* **Bottom clearance**

Bottom clearance after installation can be reduced to 5mm.

This must be obtained with an easily removable panel, to enable the consumer to view the system pressure gauge, and to provide the 100mm clearance required for servicing.

2 SYSTEM REQUIREMENTS - Central Heating

Notes

a. *The method of filling, refilling, topping up or flushing sealed primary hot water circuits from the mains via a temporary hose connection is only allowed if acceptable to the local water authority.*

b. *Antifreeze fluid, corrosion and scale inhibitor fluids suitable for use with boilers having aluminium heat exchangers may be used in the central heating system.*

General

1. The installation must comply with all relevant national and local regulations.

2. The installation should be designed to work with flow temperatures of up to 86 °C.

3. All components of the system must be suitable for a working pressure of 3 bar and temperature of 110 °C. Extra care should be taken in making all connections so that the risk of leakage is minimised.

The following components are incorporated within the appliance:

a. Circulating pump.

b. Safety valve, with a non-adjustable preset lift pressure of 3 bar.

c. Pressure gauge, covering a range of 0 to 4 bar.

d. An 8-litre expansion vessel, with an initial charge pressure of 0.75 bar.

4. 'Make-up' Water. Provision must be made for replacing water loss from the system, either :

a. From a manually filled 'make-up' vessel with a readily visible water level. The vessel should be mounted at least 150mm above the highest point of the system and be connected through a non-return valve to the system, fitted at least 150mm below the 'make-up' vessel on the return side of the radiators. ***or***

b. Where access to a 'make-up' vessel would be difficult, by pre-pressurisation of the system.

The maximum cold water capacity of the system should not exceed 143 litres, if not pressurized. However, if the system is to be pressurized, the efficiency of the expansion vessel will be reduced and a larger vessel (or smaller system volume) may be necessary. If the capacity of the vessel is not considered sufficient for this, or for any other reason, an additional vessel MUST be installed on the return to the boiler.

Guidance on vessel sizing is given in table opposite.

5. Filling

The system may be filled by the following method:

Through a temporary hose connection from a 'draw-off' tap, supplied from a service pipe under mains pressure. Where the mains pressure is excessive, a pressure reducing valve must be used to facilitate filling. When installing the filling device, it must be connected as below to fully comply with the water regulations.

This may involve the fitting of an additional WRAS approved isolator valve to the mains supply.

i. Thoroughly flush out the whole system with cold water.

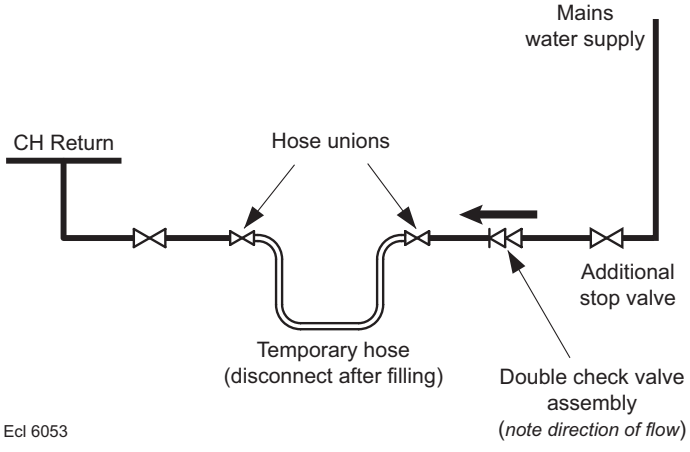
ii. Fill and vent the system until the pressure gauge registers 1.5 bar, and examine for leaks.

iii. Check the operation of the safety valve by raising the water pressure until the valve lifts. This should occur within 0.3 bar of the preset lift pressure.

iv. Release water from the system until the minimum system design pressure is reached; 1.0 bar if the system is to be pre-pressurised.

Safety valve setting	bar	3.0	
Vessel charge pressure	bar	0.5 to 0.75	
System pre-charge pressure	bar	None	1.0
System volume (litres)		**Expansion vessel volume (litres)**	
25		1.6	1.8
50		3.1	3.7
75		4.7	5.5
100		6.3	7.4
125		7.8	9.2
150		9.4	11.0
175		10.9	12.9
190		11.9	14.0
200		12.5	14.7
250		15.6	18.4
300		18.8	22.1
For other system volumes multiply by the factor across		0.063	0.074

Model	30
Max CH uutput kW (Btu/h)	30.3 (103,300)
Water flow rate l/min (gal/min)	21.5 (4.7)
Temp differential °C (°F)	20 (36)
Head available for system m.w.g. (ft.w.g.)	1.9 (6.2)



3 SYSTEM BALANCING

The boiler does not normally need a bypass but at least some radiators on the heating circuit, of load of at least 10% of the minimum boiler output, must be provided with twin lockshield valves so that this minimum heating load is always available. See note regarding thermostatic radiator valves on page 8.

Note. *Systems incorporating zone valves which could completely cut off the flow through the system must also include a bypass.*

BALANCING

1. Set the programmer to ON.

   Close the manual or thermostatic valves on all radiators, leaving the twin lockshield valves (on the radiators referred to above) in the OPEN position.

   Turn up the room thermostat and adjust the lockshield valve to give an uninterrupted flow through the radiator.

   These valves should now be left as set.

2. Open all manual or thermostatic radiator valves and adjust the lockshield valves on the remaining radiators, to give around 20°C temperature drop at each radiator.

3. Adjust the room thermostat and programmer to NORMAL settings.

4 WATER TREATMENT

CENTRAL HEATING

The Keston System range of boilers have an ALUMINIUM alloy heat exchanger.

IMPORTANT.
The application of any other treatment to this product may render the guarantee of Keston Invalid.

Keston recommend Water Treatment in accordance with the Benchmark Guidance Notes on Water Treatment in Central Heating Systems.

If water treatment is used **Keston** recommend only the use of Scalemaster Gold 100, FERNOX, MBI & F1 or SENTINEL X100 inhibitors and associated water treatment products, which must be used in accordance with the manufacturers' instructions.

Notes.

1. *It is most important that the correct concentration of the water treatment products is maintained in accordance with the manufacturers' instructions.*
2. *If the boiler is installed in an existing system any unsuitable additives MUST be removed by thorough cleansing. BS 7593:2006 details the steps necessary to clean a domestic heating system.*
3. *In hard water areas, treatment to prevent lime scale may be necessary - however the use of artificially softened water is NOT permitted.*
4. *Under no circumstances should the boiler be fired before the system has been thoroughly flushed.*

For further information contact:

Fernox Cookson Electronics
Forsyth Road
Sheerwater
Woking
Surrey GU21 5RZ
+44 (0) 0870 601 5000

Sentinel Performance Solutions
The Heath Business & Technical Park
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www.sentinel-solutions.net

Scalemaster Water Treatment Products
Emerald Way
Stone
Staffordshire ST15 0SR
Tel: +44 (0) 1785 811636

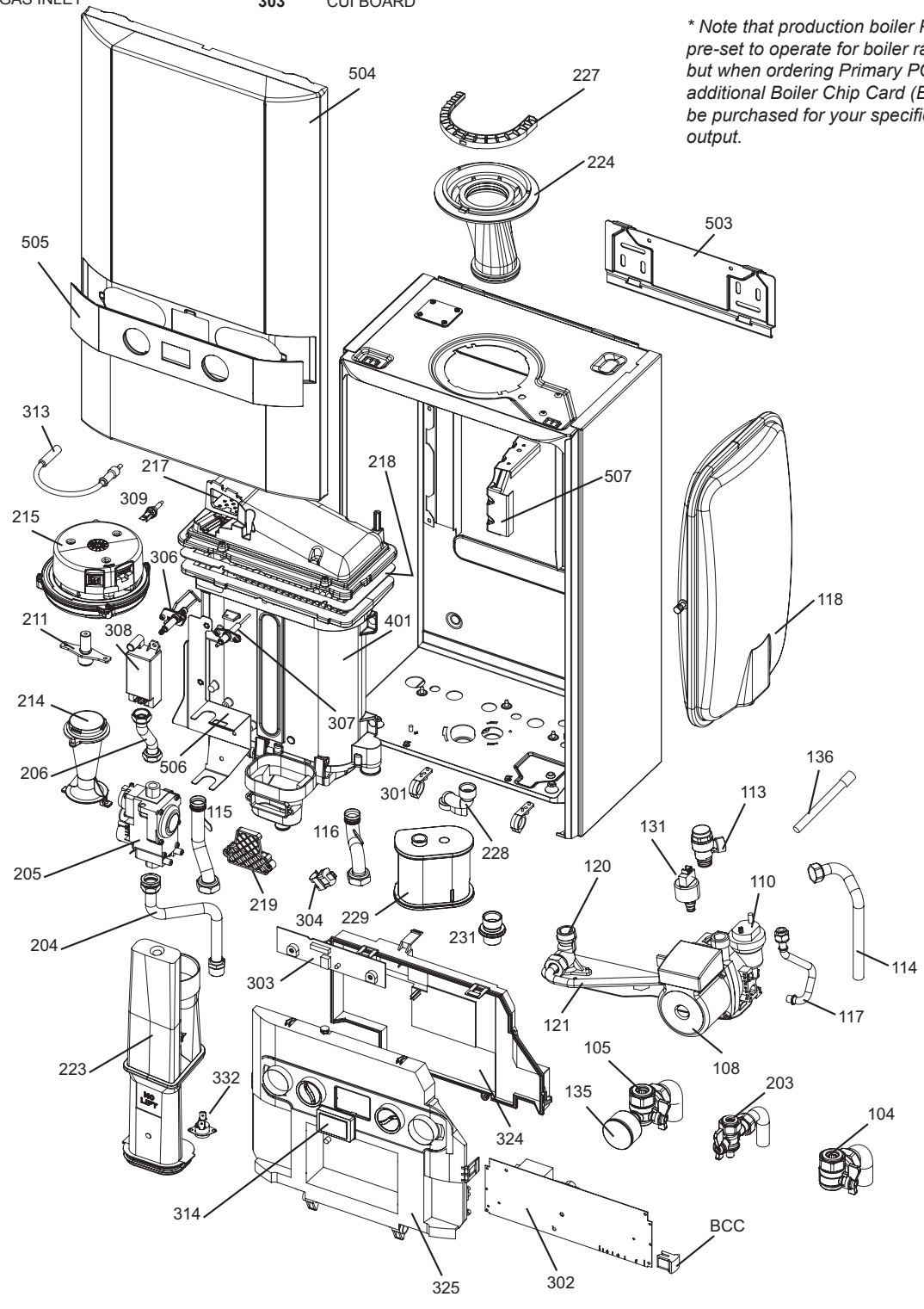
Calmag Ltd.
Unit 3-6, Crown Works
Bradford Road
Sandbeds, Keighley
West Yorkshire BD20 5LN
Tel: +44 (0) 1535 210 320

5 BOILER ASSEMBLY - Exploded View

Note that item numbers are linked to the spares list

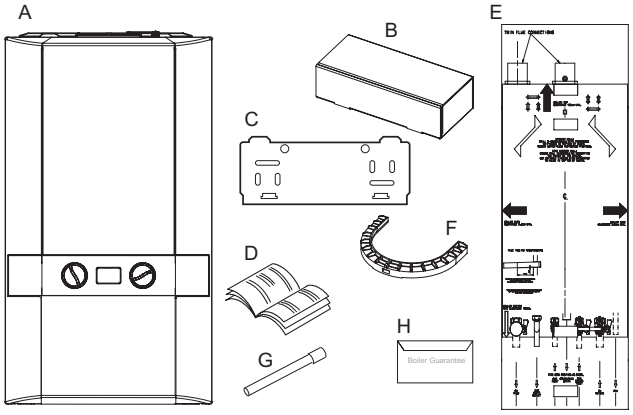
104	CH RETURN VALVE
105	CH FLOW VALVE
108	PUMP HEAD
110	PUMP AUTO AIR VENT
113	PRESSURE RELIEF VALVE
114	PIPE - PRV OUTLET
115	PIPE - FLOW
116	PIPE - RETURN
117	PIPE - EXPANSION VESSEL
118	EXPANSION VESSEL
120	FLOW GROUP MANIFOLD
121	BY-PASS KIT
131	WATER PRESSURE TRANSDUCER
135	PRESSURE GAUGE
136	SAFETY VALVE DRAIN PIPE
203	GAS COCK
204	PIPE - GAS INLET
205	GAS VALVE
206	PIPE - GAS INJECTOR
211	INJECTOR ASSEMBLY
214	VENTURI
215	FAN
217	BURNER
218	GASKET - BURNER
219	SUMP CLEAN OUT COVER
223	FLUE MANIFOLD
224	FLUE MANIFOLD TOP
227	CLAMP RETAINING FLUE TURRET
228	HOSE CONDENSATE INTERNAL
229	SIPHON TRAP
231	CONDENSATE OUTLET CONNECTION
301	CONTROLS BOX FIXINGS HINGE & SPRING
302	PRIMARY PCB*
303	CUI BOARD
304	CONTROL THERMISTOR (RETURN)
306	ELECTRODE IGNITION
307	ELECTRODE DETECTION
308	IGNITER UNIT
309	THERMISTOR CONTROL/NO FLOW
313	IGNITION LEAD
314	CONTROL BOX LENS
324	CONTROLS BOX LID
325	CONTROL BOX FRONT
332	FLUE THERMOSTAT
401	HEAT ENGINE
503	WALL MOUNTING BRACKET
504	FRONT PANEL
505	FASCIA
506	BRACKET - GAS VALVE
507	BRACKET - EXPANSION VESSEL

** Note that production boiler PCBs are factory pre-set to operate for boiler range and output, but when ordering Primary PCB as a spare, an additional Boiler Chip Card (BCC) MUST also be purchased for your specific boiler range and output.*



6 UNPACKING

Unpack and check the contents.



Pack A Contents

A Boiler
B Hardware Pack Box
C Wall Mounting Plate
D These Installation/Users Instructions
E Wall Mounting Template
(located on internal protective packaging)
F Turret Clamp
G Safety Valve Drain Pipe
H Boiler Guarantee & Registration Pack

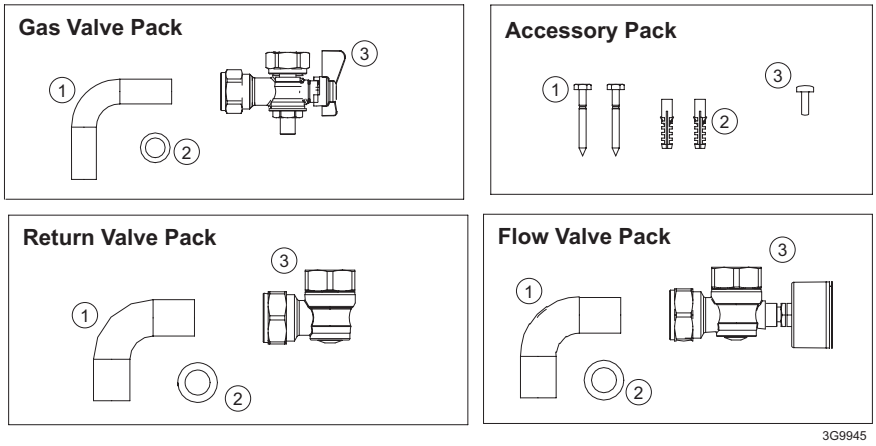
HARDWARE PACK CONTENTS

Gas Valve Pack
1. Pipe - Gas Inlet
2. Washer - Gas (blue)
3. Gas Cock

Return Valve Pack
1. Pipe CH Return
2. Washer CH
3. Valve Return

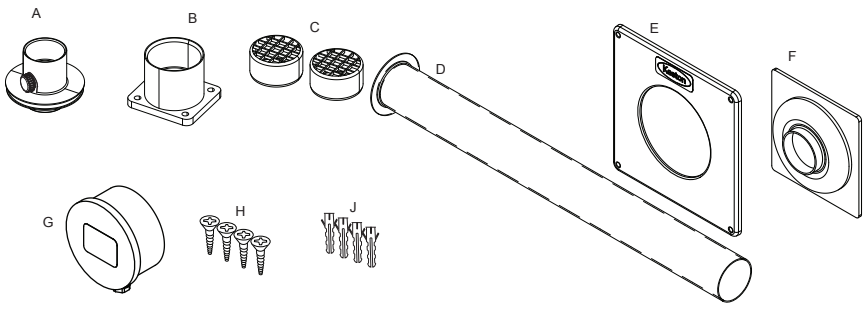
Accessory Pack
1. Screw (x2)
2. Wallplug (x2)
3. Turret Clamp Screw (X1)

Flow Valve Pack
1. Pipe CH Flow
2. Washer CH
3. Valve Flow (with gauge)



Flue Pack Contents

A Flue Adaptor
B Air Spigot
C Terminals - 2 off
D Flue Sleeve
E Wall Plate
F Wall Seal
G Outside Sensor
H Screws - 4 off
J Wall Plugs - 4 off

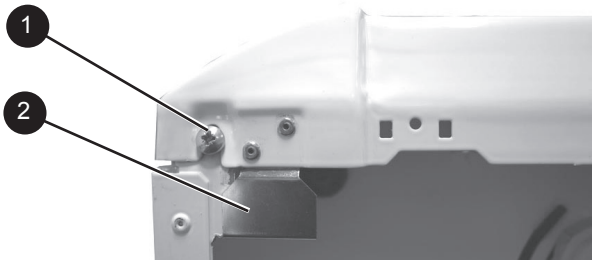


7 FRONT PANEL REMOVAL

1. Loosen the 2 screws retaining the front panel.

2. Pull the two spring clips downwards to disengage.

3. Pull the front panel forward and upwards to remove.



8 FLUE SYSTEM

When installing a replacement boiler a new flue system must be used. **DO NOT** re-use the existing boiler flue installation.

DESIGN

Individual air supply and flue outlet pipes are used as standard. **The material used for flue outlet &/or air inlet must be muPVC (PVC-C) to BS 5255 and/or BSEN 1566-1 and BSEN 1329 of an internal diameter of 51mm. (i.e. nominal 50mm diameter muPVC solvent weld waste pipe).**

Marley muPVC (PVC-C) Solvent Weld Waste System (50mm) and Polypipe System 2000 muPVC (PVC-C) solvent weld waste (50mm) are the only systems approved for this application.

The following pipes and fittings are approved:

Polypipe System 2000 muPVC solvent Weld Waste System (50mm)	
Poly Pipe Code	
MU 301	*4m length muPVC wastepipe 5/225*
MU 313	*50mm x 45 deg muPVC obtuse bend*
MU 314	*50mm x 92.5 deg muPVC swept bend*
MU 310	*50mm muPVC straigh coupling*
MU 316	*50mm x 92.5 deg muPVC swept pipe*

Marley muPVC solvent Weld Waste System (50mm)	
Marley Code	
KP 304	50mm x 4m double spigot pipe
KP32	50mm x 45 deg bend
KSC3	50mm straight coupling
KB3	50mm x 88.5 deg bend
KT3	50mm swept tee

continued.....

9 FLUE SYSTEM.... CONT'D

TERMINATION OF THE FLUE AND AIR

The flue and air pipes may terminate independently through any external walls within the same dwelling except on opposing walls, within the maximum lengths shown in graph below.

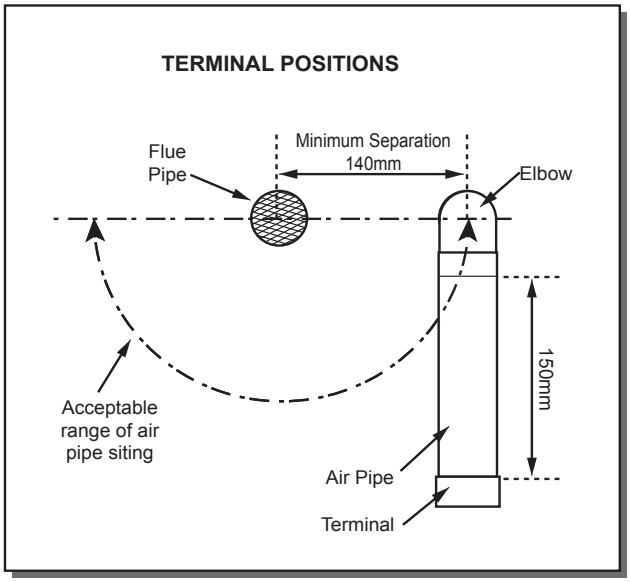
The air pipe must have an elbow and 150mm length of pipe directed downwards with a termination grill fitted.

The air pipe can be situated at the side or beneath the flue pipe to a minimum dimension of 140mm (see diagram opposite). It must not be sited above the flue pipe.

The flue and air pipes must extend by at least 40mm from the wall surface.

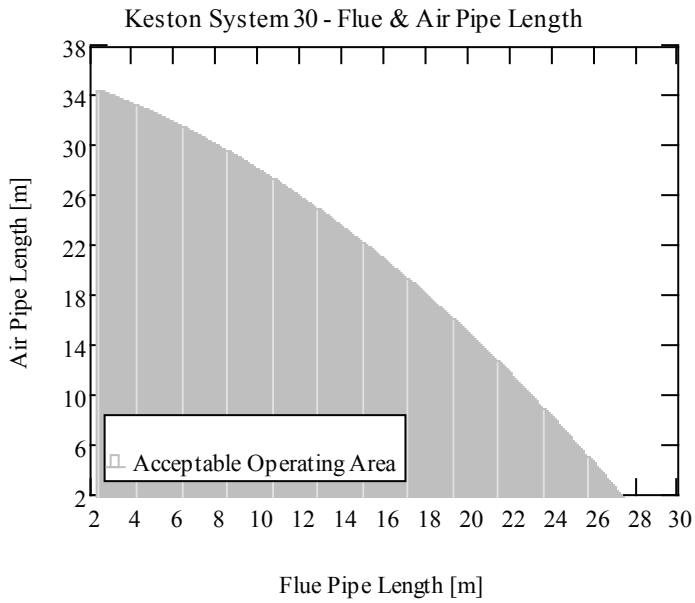
Condensing boiler emit a visible plume of water vapour from the flue terminal, this is normal. It is the responsibility of the installer to judiciously select a terminal location that does not cause a nuisance.

If either the flue or air terminal is below a height of 2m from ground level a terminal guard must be fitted.



MAXIMUM LENGTHS

Due to the resistance presented by extended flue length a slight reduction in maximum boiler output will occur where combined flue and air lengths in excess of 18.0m (50mm muPVC) are used. In such cases the boiler output will be reduced by 0.6% per additional metre.
The maximum lengths of both air inlet pipe and flue outlet pipe, when no bends are used, are as detailed in graph below. However, each bend used has an equivalent length that must be deducted from the maximum straight length stated in graph below. Knuckle bends must not be fitted.
A 92.5º swept elbow is equivalent to 1.0m straight length. A 45º bend is equivalent to 0.5m straight length.
It is possible to have variable flue and air lengths as described within the shaded area of graph below.

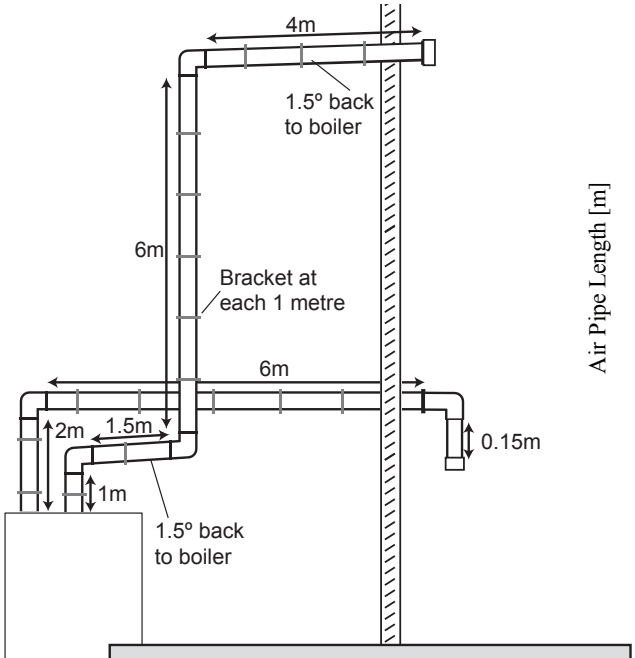


SLOPE

'Horizontal' flue outlet pipework MUST slope at least 1.5 degrees (26mm per metre run) downwards towards the boiler. Pipework can be vertical. Only swept elbows can be used.

Air inlet pipework can be truly horizontal or vertical, or sloping in a downward direction towards the boiler but in each case rain, etc., **must** be prevented from entering the pipe. **There must be no troughs in any of the pipework, whether it be air inlet or flue outlet.**

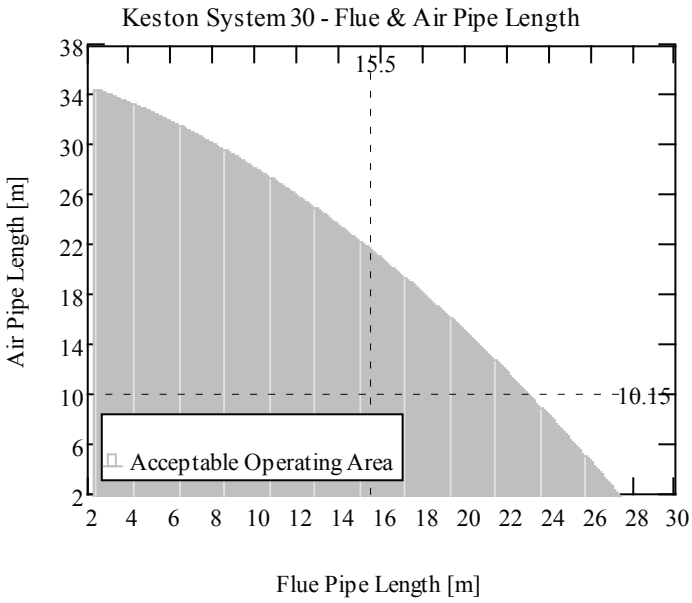
10 FLUE INSTALLATION EXAMPLE KESTON SYSTEM 30



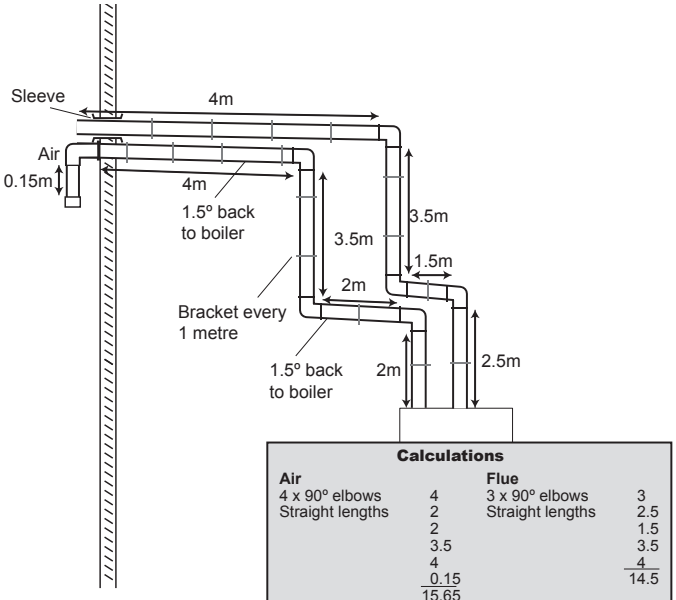
Calculations

Air	Flue
Elbows 2 x 1m = 2m	Elbows 3 x 1m = 3m
Straights 6+2+0.15 = 8.15m	Straights 4+6+1.5+1 = 12.5m
Total = 10.15m	Total = 15.5m

Overall Flue / Air = 25.65m



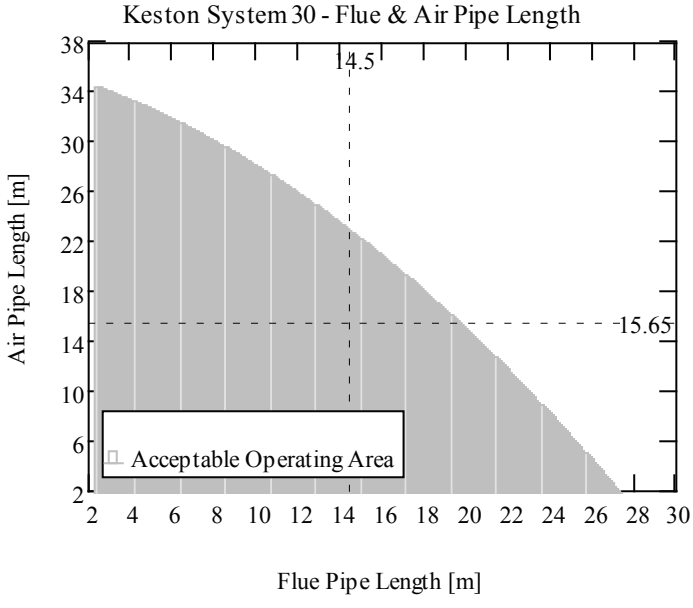
11 FLUE INSTALLATION EXAMPLE KESTON SYSTEM 30



Calculations

Air		Flue	
4 x 90° elbows	4	3 x 90° elbows	3
Straight lengths	2	Straight lengths	2.5
	2		1.5
	3.5		3.5
	4		4
	0.15		14.5
	15.65		

Overall Flue / Air = 30.15m



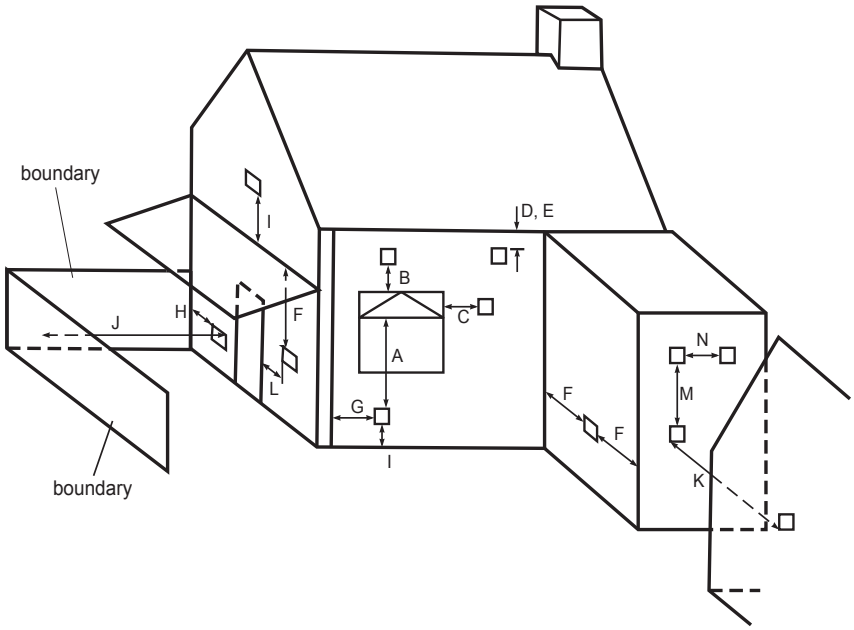
FLUE OUTLET

12 FLUE TERMINATION POSITION

Twin Flue Positions		Flue Minimum Spacing		Air Minimum Spacing	
A.	Below an opening (1)	300 mm	12"	50 mm	2"
B.	Above an opening (1)	300 mm	12"	50 mm	2"
C.	Horizontally to an opening (1)	300 mm	12"	50 mm	2"
D.	Below gutters, soil pipes or drain pipes	75 mm	3"	75 mm	3"
E.	Below eves	200 mm	8"	50 mm	2"
F.	Below balcony or car port roof	200 mm	8"	50 mm	2"
G.	From a vertical drain pipe or soil pipe	150 mm	6"	50 mm	2"
H.	From an internal or external corner or to a boundary alongside the terminal	300 mm	12"	50 mm	2"
I.	Above ground, roof or balcony level	300 mm	12"	100 mm	4"
J.	From a surface or a boundary facing the terminal	600 mm	24"	100 mm	4"
K.	From a terminal facing the terminal	1200 mm	48"	1200 mm	48"
L.	From an opening in the car port into the building	1200 mm	48"	100 mm	4"
M.	Vertically from a terminal on the same wall	1500 mm	60"	1500 mm	60"
N.	Horizontally from a terminal on the same wall	300 mm	12"	300 mm	12"

(1) An opening here means an openable element, such as a openable window, or a fixed opening such as an air vent. However, in addition, the outlet should not be nearer than 150mm (fanned draught) to an opening into the building fabric formed for the purpose of accommodating a built in element, such as a window frame.

The dimensions given in the table above may need to be increased to avoid wall staining and nuisance depending on site conditions.



GENERAL INSTALLATIONS

All parts of the system must be constructed in accordance with BS 5440 Part 1, except where specifically mentioned in these instructions.

All pipe work must be adequately supported.

All joints other than approved push-on or plastic compression connectors must be made and sealed with solvent cement suitable for muPVC pipes and conforming to BS 6209: 1982.

Consideration must be given to Corgi/Gas Safe bulletin TB200/TB008 regarding flues in voids.

The boiler casing must always be correctly fitted to the boiler when leaving the appliance operational.

External wall faces and any internal faces of cavity walls must be good.

Rubber collars are available for flue and air terminals to finish the external wall face around the terminals (Part No C.08.00.07.0).

AIR SUPPLY

The Keston Combi is a room-sealed appliance and therefore does not require purpose provided ventilation to the boiler room for combustion air.

COMPARTMENT INSTALLATION

Due to the low casing temperatures generated by the boiler, no compartment ventilation is required. However, the cupboard or compartment must not be used for storage.

13 INSTALLING THE BOILER

Installation of the boiler is straightforward but consideration must be given to access to allow flue and air pipes to be pushed through walls and ceilings. The order in which the components are installed will depend upon particular site conditions, but in general it will be easiest and most accurate to install the boiler and then build up the flue outlet and air inlet pipes to the terminal - this is the sequence described.

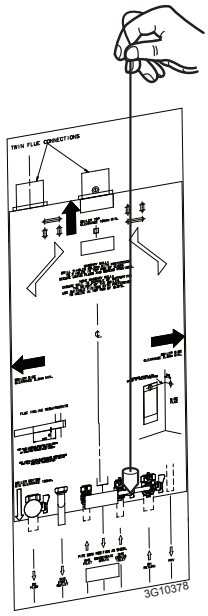
14 WALL MOUNTING TEMPLATE

The wall mounting template is located on the internal protective packaging.

Note.
The template shows the positions of the fixing holes and the rear flue hole centre for standard installation. Care MUST be taken to ensure the correct holes are drilled.

1. Tape template into the selected position. Ensure squareness by hanging a plumbline as shown.
2. If fitting a side flue extend the flue centre line onto the side wall and measure in 155mm for standard installation.
3. Mark onto the wall the following:
   - **a** The wall mounting plate screw positions (choose one from each group).
   - **b.** The position of the flue duct hole (see diagram below).

   Note. *Mark the centre of the hole as well as the circumference.*
4. Remove the template from the wall.

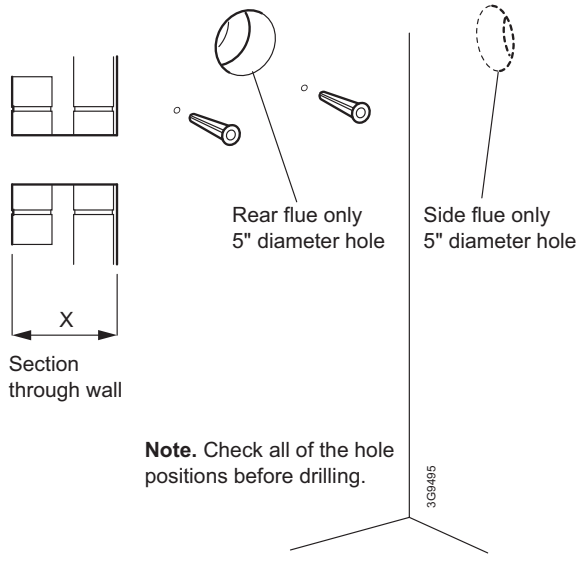


15 PREPARING THE WALL

IMPORTANT.

Ensure that, during the cutting operation, masonry falling outside of the building does not cause damage or personal injury.

1. Cut the flue hole (preferably with a 5” core boring tool), ensuring that the hole is square to the wall. Both wall faces immediately around the cut hole should be flat.
2. Drill 2 holes with a 7.5mm / 8mm masonry drill and insert the plastic plugs, provided, for the wall mounting plate.
3. Locate 2 No.14 x 50mm screws in the wall mounting plate (one at each side, in any of the 3 holes provided at each side) and screw home.

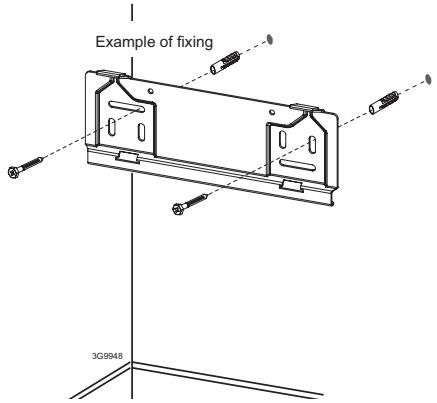


FLUE OUTLET

16 FITTING THE WALL MOUNTING PLATE

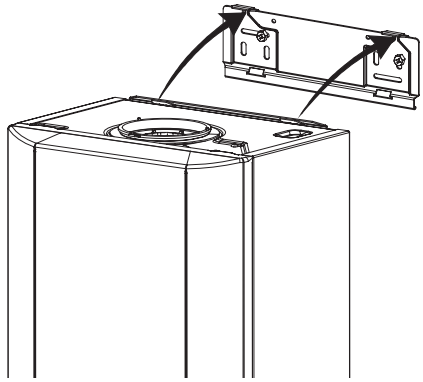
Screw the wall mounting plate to the wall using 2 wall plugs (previously fitted) with the 2 screws provided.

Choose one of the 2 sets of slots in left and right bank. Ensuring that at least one of the screws is fitted into a top slot.



17 MOUNTING THE BOILER

1. Ensure the plastic plug is removed from the CH connections before mounting the boiler.
2. Lift the boiler onto the wall mounting plate (refer to the Introduction section for safe handling advice), locating it over the two tabs.



18 ASSEMBLY PRACTICE

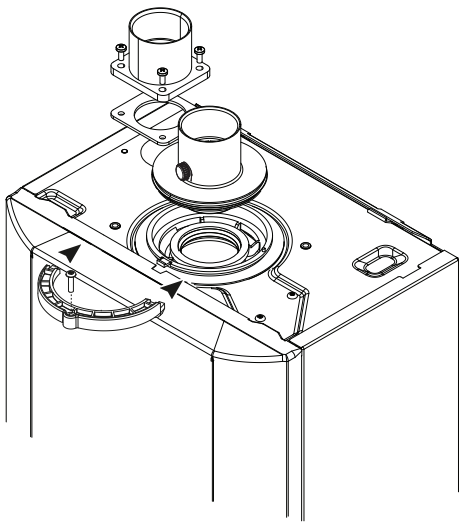
Remove all plastic debris and burrs when installing air intake piping. Plastic fillings caused by cutting muPVC pipe must not be allowed to be drawn into the combustion air blower. Prevent dust entering the air intake when cutting on building sites. Blower failure which is determined to be caused by plastic filings or other debris will not be covered by guarantee.

INSTALLING FLUE AND AIR PIPES

Important - When installing the boiler on an existing system a new flue and air intake system MUST also be installed. You **MUST NOT** re-use existing flue or air pipework components.

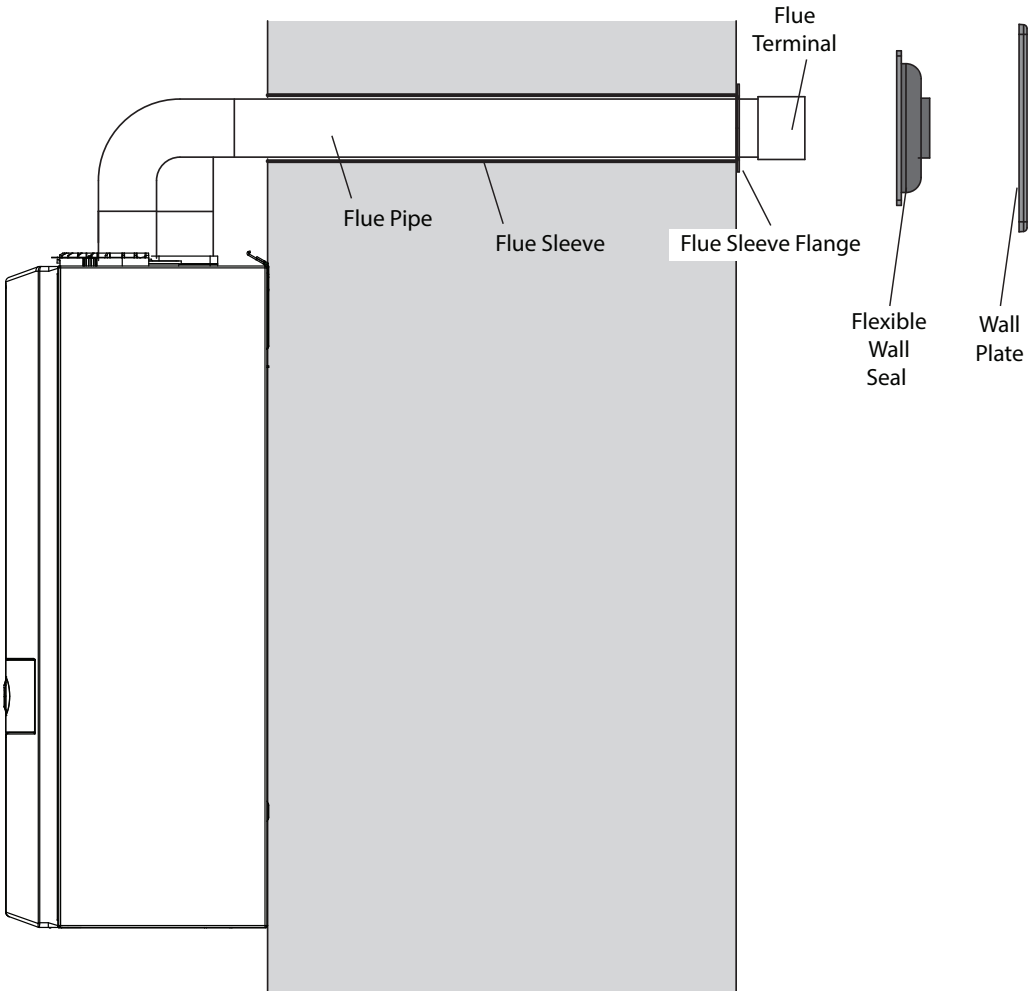
- Remove the flue adaptor and air spigot from the flue pack supplied with the boiler.
- Remove boiler front panel - Frame 38.
- Remove air intake blanking plate by unscrewing 4 x M5 screws and put to one side, leaving sponge gasket in place.
- Fix air spigot to boiler using the 4 M5 screws, see diag. below. Ensure sponge gasket is in place and not damaged.
- Insert the flue adaptor into the flue manifold on the top of the boiler ad secure using the clamp provided in the packaging box, see diagram below.
- Measure, cut and check the air and flue pipes to pass to the exit from the wall(s) or ceiling.
- Always thoroughly deburr all pipes and most important, remove shavings from within the pipe.
- Assemble, using solvent weld cement, the pipework from the boiler connections to the exit from the first wall/ceiling, (remount the boiler if removed). When pushing pipe through walls, ensure grit and dust is not allowed to enter the pipe.
  Ensure pipes are fully engaged into sockets and solvent welded with no leaks.
- Using the same methods drill any further holes (always covering existing pipework), cut and assemble the pipework.
- From outside, complete the two terminations - See Frame 9 Flue System and make good all holes. (Wall sealing collars are available to make good hole areas on the wall face (part number C.08.0.00.07.0).
- **Support any pipes whose route could be displaced either of its own accord or by accident. Any horizontal run over 1m or vertical runs of any length must always be supported. Brackets should be placed at intervals of approximately 1m. Brackets should be loose enough on the pipe to allow thermal expansion and contraction movement.**
- **Flue pipework through walls MUST be sleeved to allow thermal expansion and contraction movement.**
- Check all connections for security and re-seal any joints using solvent cement where soundness may be in doubt.

Note. It is equally important to seal the air inlet with solvent cement as the flue outlet pipe joints.

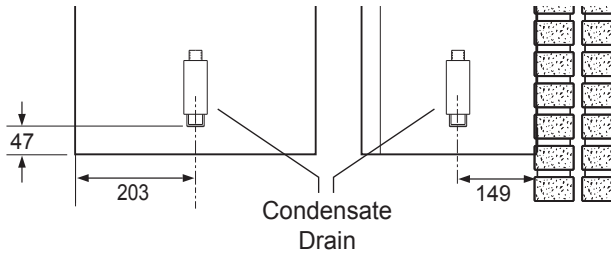


19 FITTING THE SLEEVING

1. Cut hole in wall.
2. Measure wall Thickness
3. Cut sleeve length to match wall thickness & remove burrs.
4. Grout sleeve into wall with flange on external face.
5. Slide flue pipe into sleeve, checking it is free to slide.
6. Slide Flexible wall seal over flue pipe and push centre ring up to sleeve flange when cold.
7. Locate wall plate over flexible wall seal and clamp in place using the raw plug pack.
8. Affix flue terminal
9. During boiler test check that the flue end is free to expand and contract with flexible wall seal.



20 CONDENSATE DRAIN



This appliance is fitted with a siphonic 75mm condensate trap system that requires filling before operating the appliance for the 1st time or after maintenance.

All condensate pipework should conform to the following:

a. Where a new or replacement boiler is being installed, access to an internal 'gravity discharge' termination should be one of the main factors considered in determining boiler location.
b. Plastic with push fit or solvent connections.
c. Internal plastic pipe work a minimum of 19mm ID (typically 22mm OD)
d. External plastic pipe must be a minimum of 30mm ID (typically 32 OD) before it passes through the sleeved wall.
e. All horizontal pipe runs, must fall a minimum of 45mm per metre away from the Boiler.
f. External & unheated pipe work should be kept to a minimum and insulated with Class "O" waterproof pipe insulation.
g. All installations must be carried out in accordance to the relevant connection methods as shown in the "Condensate installation diagrams" & BS6798:2009
h. Pipe work must be installed so that it does not allow spillage into the dwelling in the event of a blockage (through freezing)
i. All internal burrs should be removed from the pipe work and any fittings.

In order to minimise the risk of freezing during prolonged very cold spells, one of the following methods of terminating condensate drainage pipe should be adopted.

Internal Drain Connections

Wherever possible, the condensate drainage pipe should be routed to drain by gravity to a suitable internal foul water discharge point such as an internal soil and vent stack or kitchen or bathroom waste pipe etc. See Figs 1 and 2.

Condensate Pump

Where gravity discharge to an internal termination is not physically possible or where very long internal pipe runs would be required to reach a suitable discharge point, a condensate pump of a specification recommended by the boiler or pump manufacturer should be used terminating into a suitable internal foul water discharge point such as an internal soil and vent stack or internal kitchen or bathroom waste pipe etc. (fig 3).

External Drain Connections

The use of an externally run condensate drainage pipe should only be considered after exhausting all internal termination options as described previously. An external system must terminate at a suitable foul water discharge point or purpose designed soak away. If an external system is chosen then the following measures must be adopted:

The external pipe run should be kept to a minimum using the most direct and "most vertical" route possible to the discharge point, with no horizontal sections in which condensate might collect.

- For connections to an external soil/vent stack see Fig 4. Insulation measures as described should be used.
- When a rainwater downpipe is used, an air break must be installed between the condensate drainage pipe and the downpipe to avoid reverse flow of rainwater into the boiler should the downpipe become flooded or frozen, see Fig 5.
- Where the condensate drain pipe terminates over an open foul drain or gully, the pipe should terminate below the grating level, but above water level, to minimise "wind chill" at the open end. The use of a drain cover (as used to prevent blockage by leaves) may offer further prevention from wind chill. See Fig 6.
- Where the condensate drain pipe terminates in a purpose designed soak away (see BS 6798) any above ground condensate drain pipe sections should be run and insulated as described above. See Fig 7

Unheated Internal Areas

Internal condensate drain pipes run in unheated areas, e.g. lofts basements and garages, should be treated as external pipe.

Ensure the customer is aware of the effects created by a frozen condensate and is shown where this information can be found in the user manual.

Figure 1 - Connection of Condensate Drainage Pipe to Internal Soil & Vent Stack

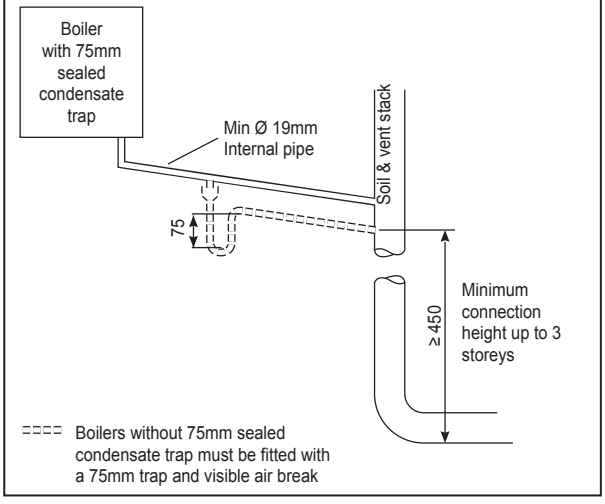
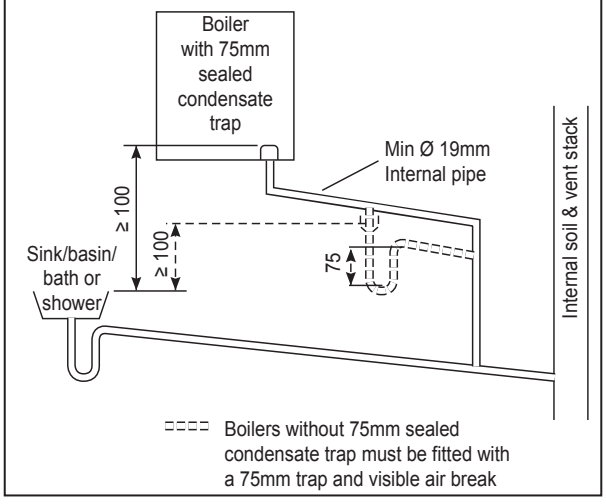


Figure 2 - Connection of a Condensate Drainage Pipe Downstream of a Sink, Basin, Bath or Shower Water Trap to Internal Soil Vent Stack



continued . . . . .

21 CONDENSATE DRAIN - CONT'D.....

Figure 3 - Connection of a Condensate Pump Typical Method (see manufacturers detailed instructions)

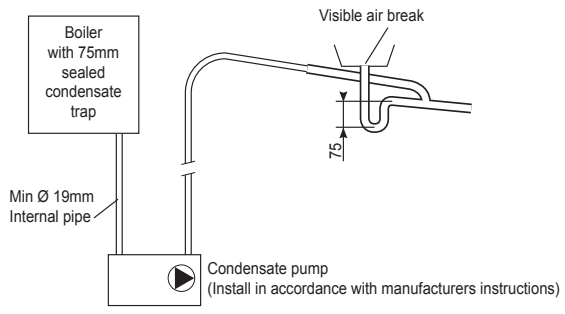


Figure 4 - Connection of condensate Drainage Pipe to External Soil & Vent Stack

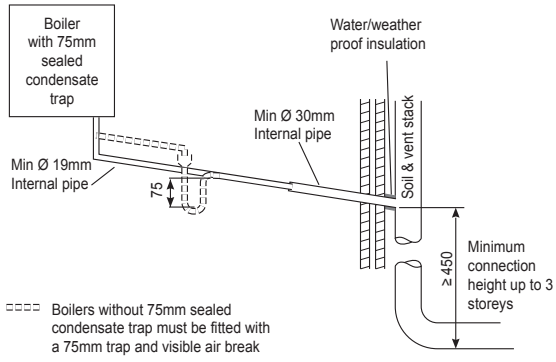


Figure 5 - Connection of a Condensate Drainage Pipe to an External Rainwater Downpipe (only combined foul/rainwater drain)

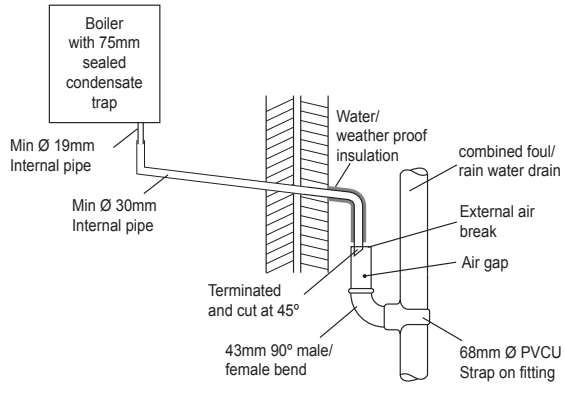


Figure 6 - Connection of Condensate Drainage Pipe Upstream of a Sink, Basin, Bath or Shower Waste Trap to External Drain, Gulley or Ranwater Hopper

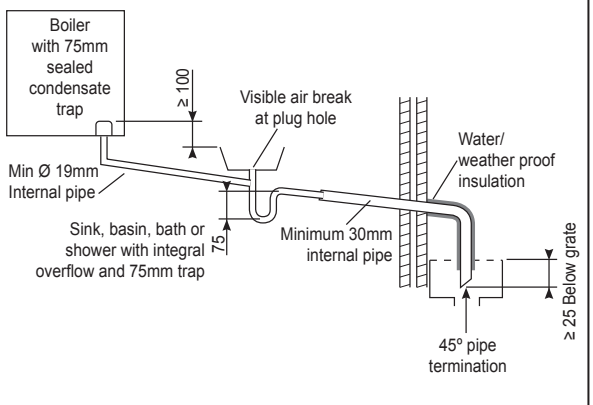
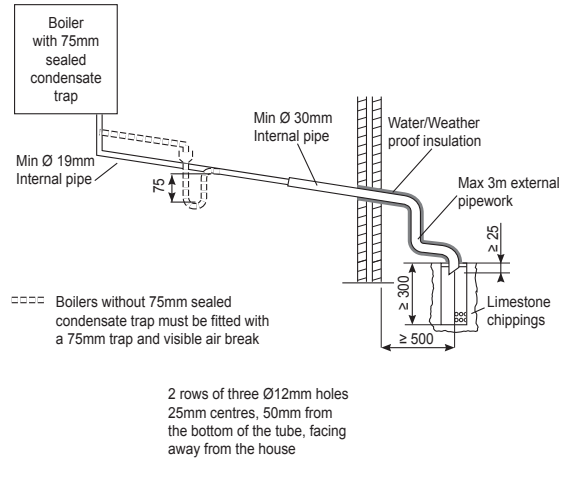


Figure 7 - Connection of a Condensate Drainage Pipe to an External Purpose Made Soak Away.



22 CONNECTIONS & FILLING

NOTES.
Ensure all boss blanking plugs are removed before connecting hardware. Each valve must be fitted to the correct boss as shown in the picture.

Ensure each union is fitted with fibre seals provided. Do not subject any of the isolating valves to heat as the seals may be damaged.

WATER CONNECTIONS CH

1. Connect the CH flow service valve provided in the hardware pack to the threaded boss connection provided at the lower rear of the boiler.
2. Connect the CH return valve.
3. If connecting the boiler to heating loads in excess of 60,000 Btu/h, connecting flow and return heating systems pipework must be sized in 28mm diameter at the point of pipe connection to the boiler tails. Use 22mm x 28mm pipe adaptors as appropriate.

GAS CONNECTION

IMPORTANT. The gas service cock is sealed with a non-metallic blue fibre washer, which must not be overheated when making capillary connections. Refer to Frame 1 for details of the position of the gas connection.

For additional gas supply information refer to “Gas Supply” on page 8.

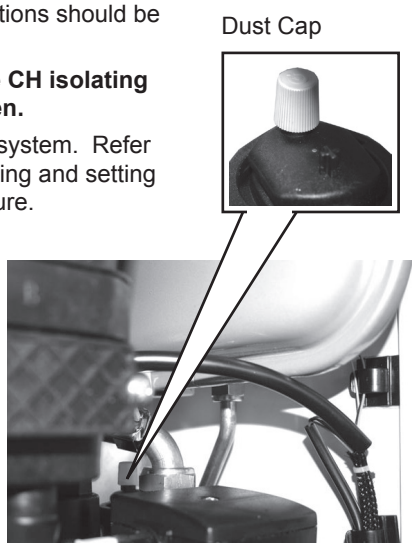
FILLING

IMPORTANT - when filling:

A. Ensure the dust cap on air vent located at the rear of the pump chamber is slightly unscrewed.

B. When filling, there may be a slight water leak from the air vent therefore electrical connections should be protected.

1. **Ensure that the CH isolating handles are open.**
2. Fill and vent the system. Refer to Frame 2 for filling and setting pressure procedure.
3. Check for water soundness.

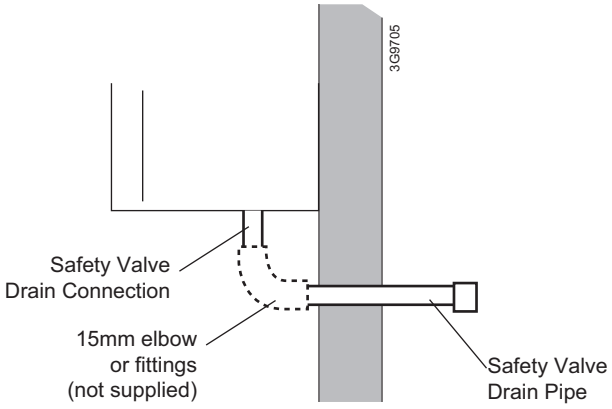


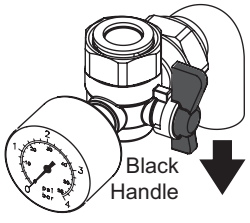
SAFETY VALVE DRAIN

The safety valve connection, located at the bottom right-hand side of the boiler, comprises a 15mm diameter stub pipe.

The discharge pipe should be positioned so that the discharge of water or steam cannot create a hazard to the occupants of the premises or damage the electrical components and wiring.

A purpose made safety valve drain pipe is provided with the boiler to allow safe discharge through a wall to the outside of the building. This is particularly relevant to ‘high rise’ installations but can be used for all installations.





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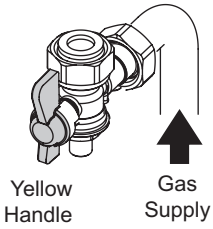
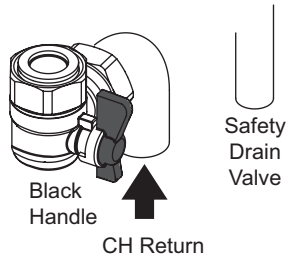
Note that all isolation handles are shown in the open position.





23 ELECTRICAL CONNECTIONS

WARNING. This appliance MUST be earthed.

A mains supply of 230Vac ~ 50 Hz is required.

The fuse rating should be 3A. All external controls and wiring must be suitable for mains voltage.

Wiring external to the boiler MUST be in accordance with the current I.E.E. (BS.7671) Wiring Regulations and any local regulations.

Wiring should be 3 core PVC insulated cable, not less than 0.75mm^2 (24 x 0.2mm), and to BS 6500 Table 16. For IE reference should be made to the current ETCI rules for electrical installations.

Connection must be made in a way that allows complete isolation of the electrical supply such as a double pole switch having a 3mm (1/8") contact separation in both poles. The means of isolation must be accessible to the user after installation.

24 INTERNAL WIRING

The Keston System boiler comes pre-fitted with 1.8m of mains cable. This must be connected to a permanent live supply and NOT switched by thermostats/programmers. For installers wishing to change this cable refer to Frame 26.

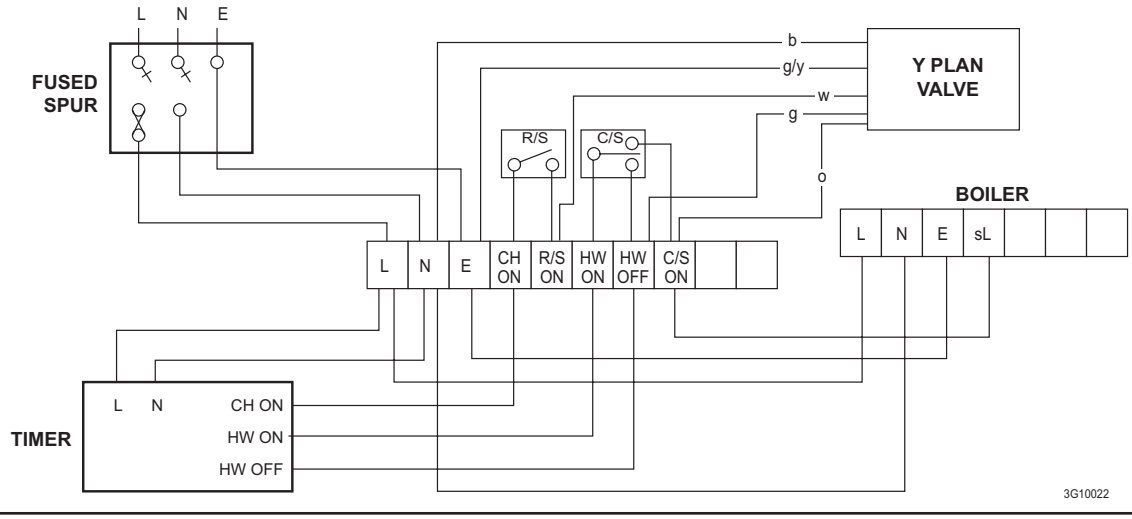
Connecting the Switched Live to the Boiler

1. Consult the Y Plan and S Plan diagrams below.
2. Isolate the mains supply to the boiler
3. Remove the front panel. Refer to Frame 7.
4. Swing the control box down into the servicing position.
5. Route incoming cable through a grommet in the bottom panel (note that the grommets are "blind" and will require puncturing) and secure using the clamp and screws provided in the hardware pack.
6. Connect the switched live to the terminal block as shown.

FROST THERMOSTAT - WIRING

If parts of the system are vulnerable to freezing or the programmer is likely to be left off during cold weather, a frost stat should be fitted in conjunction with a pipe thermostat.

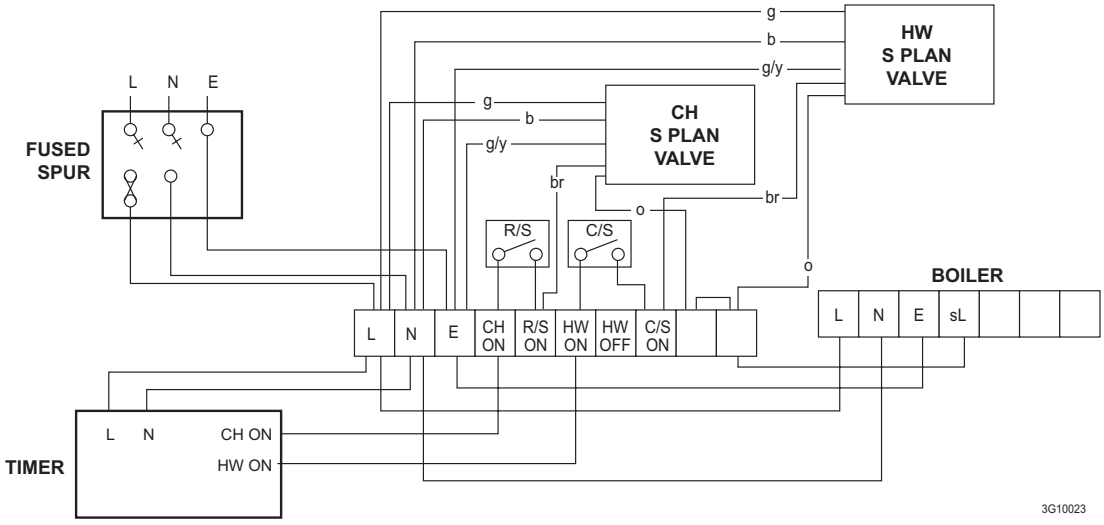
KESTON SYSTEM BOILER, Y PLAN SYSTEM WITHOUT WEATHER COMPENSATION



See overleaf for S Plan System.....

25 INTERNAL WIRING CONT'D.....

KESTON SYSTEM BOILER, S PLAN SYSTEM WITHOUT WEATHER COMPENSATION

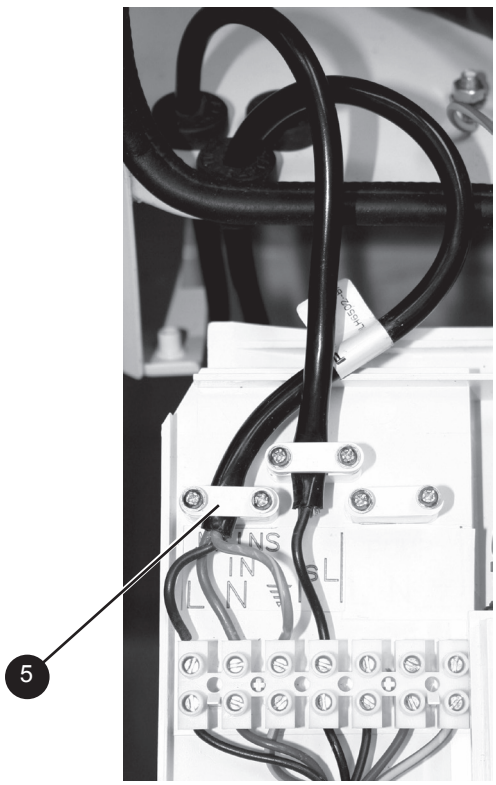


26 REPLACING PRE-FITTED MAINS CABLE

If it is necessary to use an alternative mains cable to the one pre-fitted then use the following guide.

Replacement wiring should comply with notes in Frame 23.

1. Isolate the mains supply to the boiler.
2. Remove the front panel. Refer to Frame 7.
3. Swing the control box down into the service position. Refer to frame 46.
4. Remove the live, neutral and earth wires from the terminal block.
5. Loosen the cable clamp and withdraw the mains cable.
6. Route replacement cable back through the cable clamp and grommet and re-tighten to provide cord anchorage.
7. Connect the live, neutral and earth wires to the terminal strip. When making the mains electrical connections to the boiler it is important that the wires are prepared in such a way that the earth conductor is longer than the current carrying conductors, such that if the cord anchorage should slip, the current carrying conductors become taut before the earthing conductor.
8. Swing the control box back up into the operating position and re-fit the front panel ensuring a good seal is made.



27 FITTING THE WEATHER COMPENSATION KIT - SUPPLIED AS STANDARD

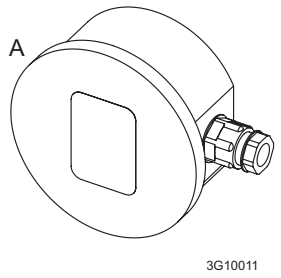
This kit provides the facility to apply outside air temperature control to the boiler water flow temperature which provides energy savings. The outside sensor provided measures outside air temperature and sends a signal to the boiler, which adjusts the maximum boiler flow temperature in response. If outside air temperature is greater than the system design temperature, the boiler flow temperature is reduced providing running cost savings. The boiler will operate in the condensing mode more frequently increasing savings.

Once the sensor is fitted it is automatically detected.

The sensor operation may be configured by adjustment of the boiler operating parameters, if necessary.

Kit Contents

A. Outside Air Sensor



FITTING THE KIT

Fitting the sensor

The air sensor should be located on an external wall of the building to be heated. Fix the sensor to a north/north-east facing wall to avoid direct radiation from the sun. The air sensor should be located to avoid any heating effect from the boiler flue.

To fix the air sensor to the wall, unscrew the sensor box plastic cover and screw/plug the sensor body to the wall.

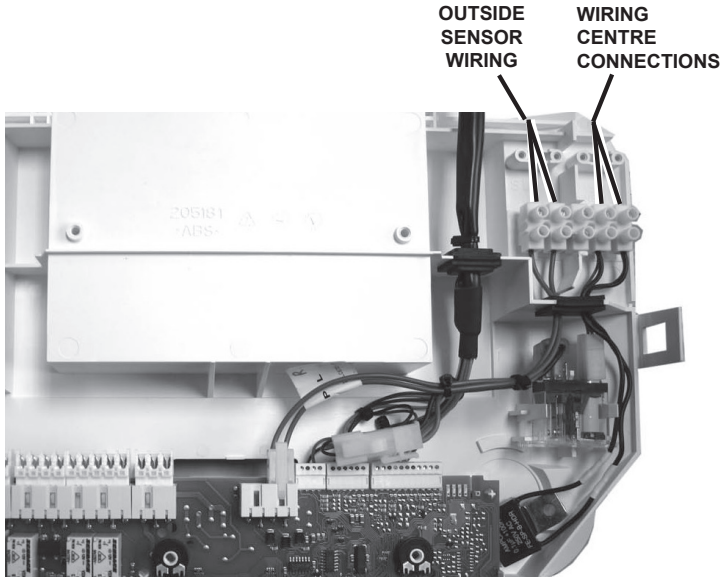
Wire a twin core 0.5mm^2 cable from the sensor to the boiler through an RH grommet located on the underside of the boiler. Cable length between sensor and boiler should be no greater than 20m. Note that this connection is safety extra low voltage. It is not necessary for the person carrying out the wiring to be approved to Part P of the Building Regulations.

Avoid running this cable alongside mains voltage cables.

The signal DHW OFF from the system wiring centre and a common neutral must be wired into the appliance through another RH grommet located on the underside of the boiler. The wire shall be suitable for mains voltages and be 0.5mm^2 twin core with sheath (Double insulated) construction according to current wiring regulations.

Fitting the kit

1. Isolate the electricity supply to the boiler and system controls.
2. Remove the boiler front panel (refer to boiler installation instructions).
3. Hinge down the control box and remove the 2 screws retaining the control box cover, release the 4 retaining clips (refer to boiler installation instructions).



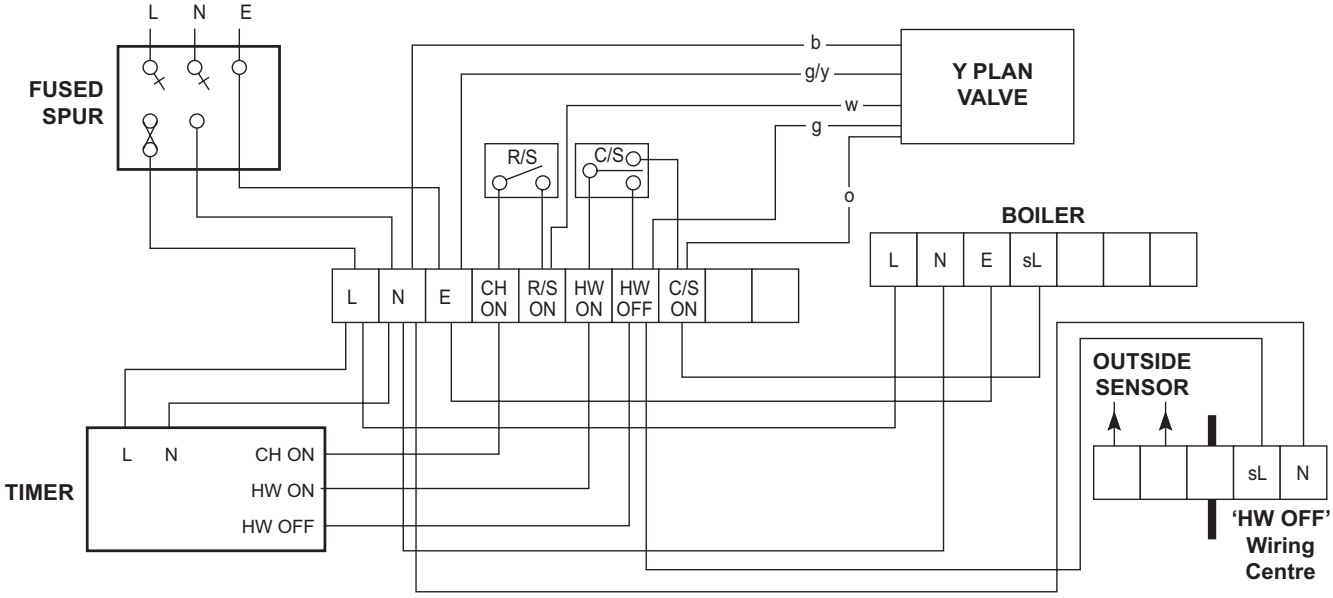
Wiring the kit

1. Carefully pierce a grommet using a suitably sized screwdriver.
2. Pass the wire from the outside sensor through this grommet, strip and prepare the ends for termination.
3. Wire the outside sensor into the 2 LHS terminals of the terminal block as shown and labelled.
4. Secure the wire with one bar clamp and two screws, ensure that there is only a small loop between the bar clamp and the grommet, and that the wire can not be trapped.
5. Carefully pierce a separate grommet using a suitably sized screwdriver.
6. Pass the 2 core sheathed wire from the wiring centre through this grommet and strip back the outer sheath, strip and prepare the ends for termination.
7. Wire the switched live signal, DHW OFF, from the wiring centre along with the permanent neutral into the 2 RHS terminals of the terminal block
8. Secure the wire with the other bar clamp and two screws, ensure that there is only a small loop between the bar clamp and the grommet, and that the wire can not be trapped.
9. Re-assemble in reverse order.

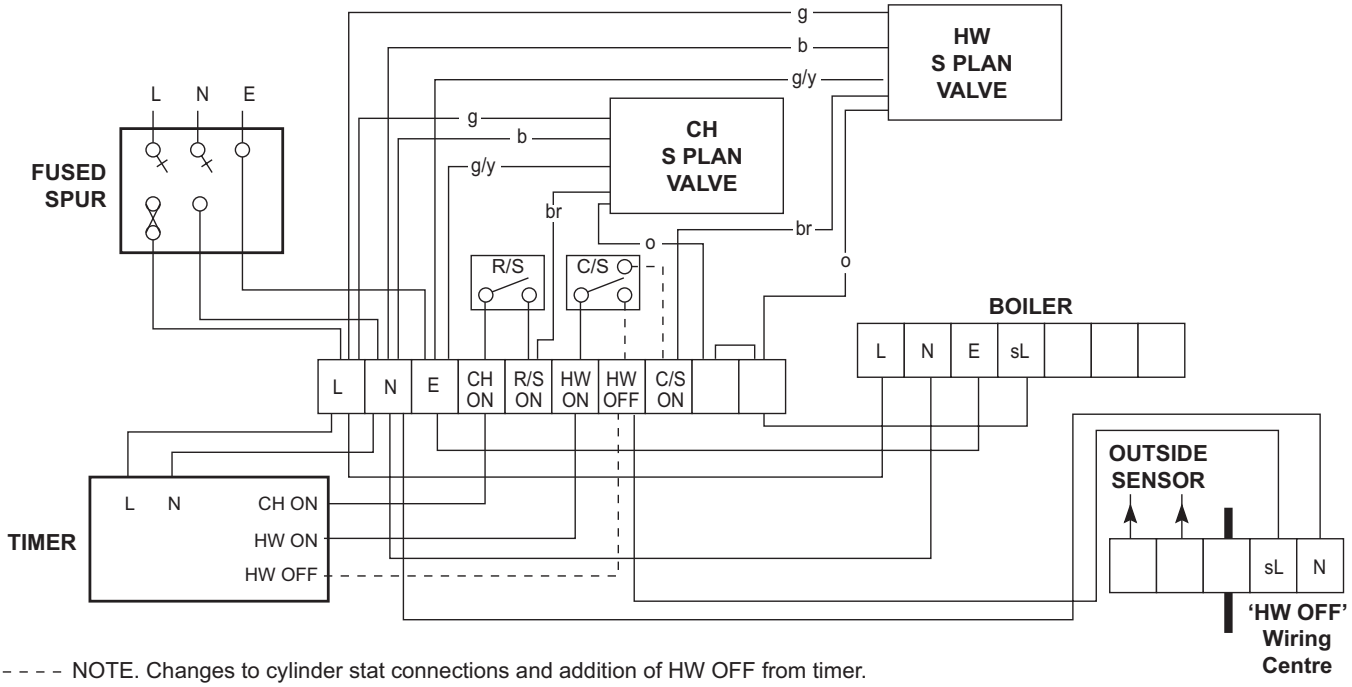
28 FITTING THE WEATHER COMPENSATION KIT - SUPPLIED AS STANDARD

KEY
b - blue
br - brown
g - green
g/y - green/yellow
o - orange
w - white

Keston System Boiler with Y Plan System & Weather Compensation Kit



Keston System Boiler with S Plan System & Weather Compensation Kit



- - - - NOTE. Changes to cylinder stat connections and addition of HW OFF from timer.

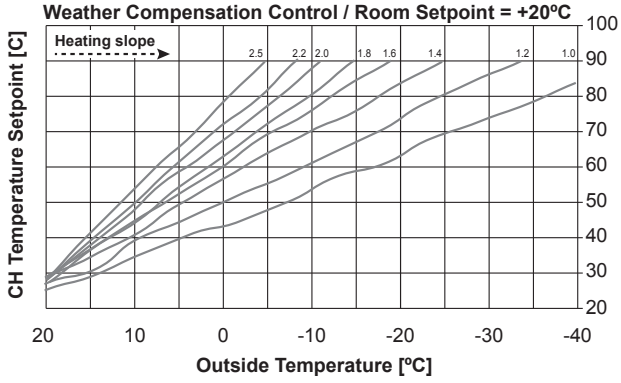
29 FITTING THE WEATHER COMPENSATION KIT - SUPPLIED AS STANDARD

CH OPERATION

The On and Off time control of central heating should be controlled by a separate timer.

During programmed On times the Central Heating Radiator Flow Temperature is controlled by the boiler relative to the Outside Temperature as shown in the diagram.

The Room temperature can be adjusted using the Central Heating Temperature Control Knob on the boiler as follows. Essentially rotating the knob clockwise increases the room temperature and rotating the knob anti-clockwise decreases the room temperature.



If the Central Heating Temperature Control Knob is rotated fully clockwise then for an Outside Temperature of 15°C a Flow Temperature of 40°C will be provided. For an Outside Temperature of 0°C a Flow Temperature of 78°C will be provided with the relationship varying lineally in between these 2 points (line on the graph 2.5)

If the Central Heating Temperature Control Knob is in its mid position then for an Outside Temperature of 15°C a Flow Temperature of 36°C will be provided. For an Outside Temperature of 0°C a Flow Temperature of 65°C will be provided with the relationship varying lineally in between these 2 points (line on the graph between 1.6 and 1.8)

If the Central Heating Temperature Control Knob is rotated fully anti-clockwise then for an Outside Temperature of 15°C a Flow Temperature of 30°C will be provided. For an Outside Temperature of 0°C a Flow Temperature of 44°C will be provided with the relationship varying lineally in between these 2 points (line on the graph 1.0)

DHW OPERATION

When the system is in a timed on period for DHW and the tank stat is not satisfied, a call for heat will be generated on the switched live into the boiler.

At the same time, the HW OFF signal will not be present, this will release the Relay and place a short across the DHW thermistor input on the Main Control board, this will ensure that Weather Compensation adjustment is ignored at this time. The set point will be fixed at 70 degrees.

The demand is indicated on the display by a 'C' and the burner on LED as appropriate.

30 EXTERNAL ELECTRICAL CONTROLS

Wiring External to the Boiler

The fuse rating should be 3A.

Wiring external to the boiler MUST be in accordance with the current I.E.E. (BS.7671) Wiring Regulations and any local regulations.

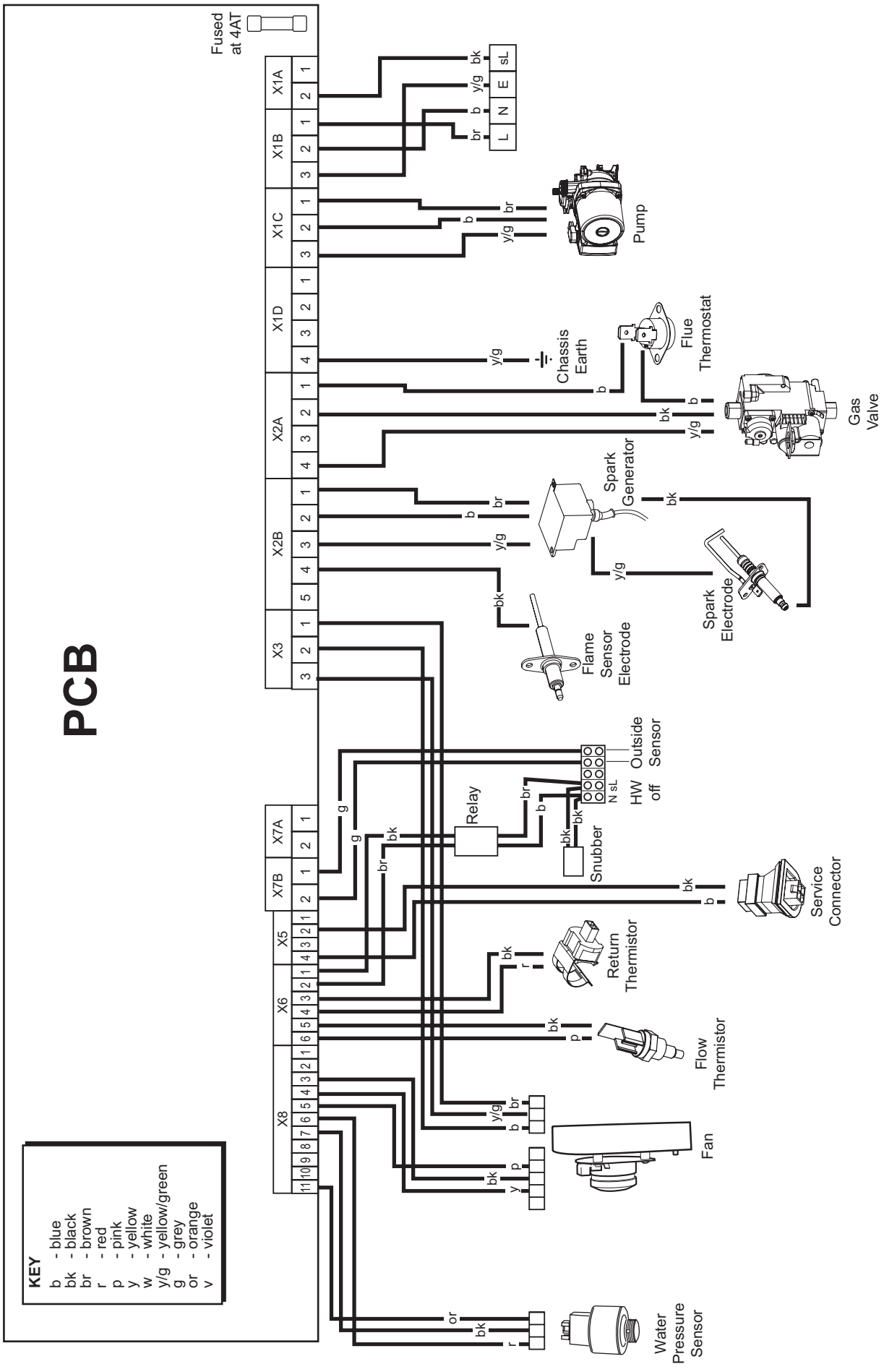
Frost Protection

If parts of the pipework run outside the house or if the boiler will be left off for more than a day or so then a frost thermostat should be wired into the system.

The frost thermostat should be sited in a cold place but where it can sense heat from the system.

Note. *If the boiler is installed in a garage it may be necessary to fit a pipe thermostat, preferably on the return pipework.*

31 WIRING DIAGRAM



32 COMMISSIONING AND TESTING

A. Electrical Installation

1. Checks to ensure electrical safety should be carried out by a competent person.
2. ALWAYS carry out the preliminary electrical system checks, i.e. earth continuity, polarity, resistance to earth and short circuit, using a suitable test meter.

B. Gas Installation

1. The whole of the gas installation, including the meter, should be inspected and tested for tightness and purged in accordance with the recommendations of BS. 6891. In IE refer to IS.813:2002.
2. Purge air from the gas installation by the approved methods only.

WARNING. **Whilst effecting the required gas tightness test and purging air from the gas installation, open all windows and doors, extinguish naked lights and *DO NOT SMOKE.***

GENERAL

Please Note: The combustion for this appliance has been checked, adjusted and preset at the factory for operation on the gas type defined on the appliance data plate. No measurement of the combustion is necessary. **DO NOT** adjust the air/gas ratio valve.

Having checked:

- That the boiler has been installed in accordance with these instructions.
- The integrity of the flue system and the flue seals, as described in the Flue Installation section.

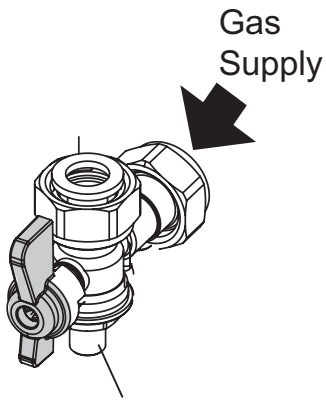
Proceed to put the boiler into operation as follows:

CHECK THE OPERATIONAL (WORKING) GAS INLET PRESSURE

Set up the boiler to operate at maximum rate.

With the boiler operating in the maximum rate condition check that the operational (working) gas pressure at the inlet gas pressure test point complies with the requirements - refer to “Gas Supply” on page 8.

Ensure that this inlet pressure can be obtained with all other gas appliances in the property working.



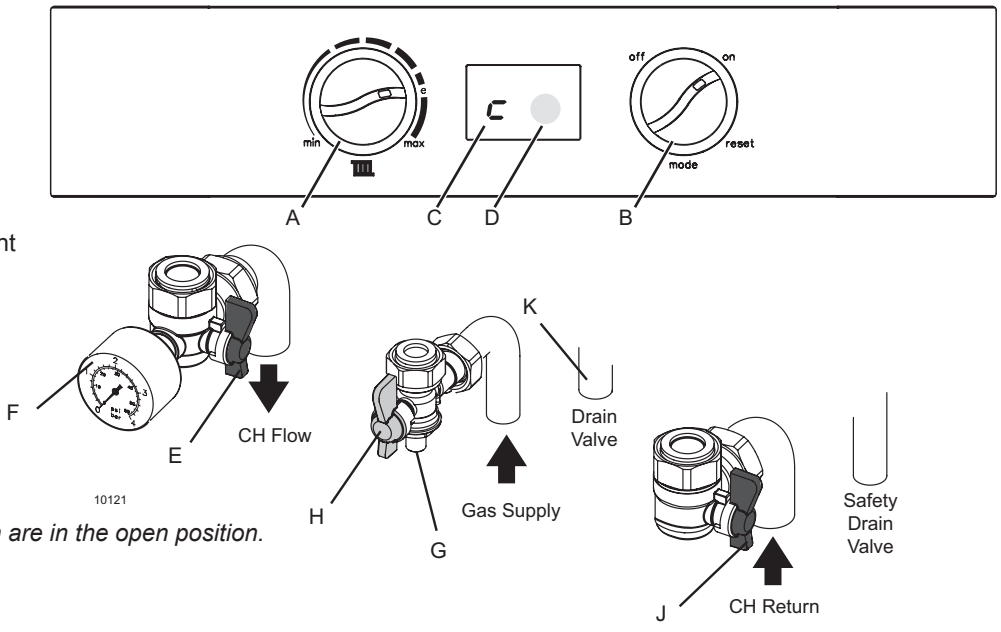
ATTENTION !

IT IS A CONDITION OF THE MANUFACTURERS WARRANTY THAT THE BENCHMARK COMMISSIONING CHECKLIST IS FULLY COMPLETED AND LEFT WITH THE APPLIANCE

33 INITIAL LIGHTING

Legend

- **A.** CH temperature control
- **B.** Mode Control Knob
- **C.** Boiler Status
- **D.** Burner 'on' indicator
- **E.** CH Flow Isolating Valve
- **F.** Pressure Gauge
- **G.** Gas Inlet Pressure Test Point
- **H.** Gas Service Cock
- **J.** CH Return Isolating Valve
- **K.** Drain Valve



Note. Valves shown are in the open position.

1. Check that the system has been filled and that the boiler is not airlocked. Ensure the automatic air vent cap is open. Refer to Frame 22.

Note.
It is important the burner is not operated before the system is fully vented of air. If it is necessary to operate the appliance pump to assist venting of the air this must be done with the gas service cock turned off.

2. Refit the boiler front panel. Refer to Frame 38.
3. Check that the drain valve (K) is closed and that the CH isolating valve (E and J) are OPEN.
4. Check that the electrical supply is OFF.
5. Check that the boiler mode control knob (B) is off.
6. Check that the gas service cock (H) is OPEN.
7. Slacken the screw in the inlet pressure test point (G) and connect a gas pressure gauge via a flexible tube.
8. Switch the electricity supply ON and check all external controls are calling for heat.

CENTRAL HEATING

9. Set the CH temp control (A) to max and turn the mode control knob (B) to ON. The boiler control should now go through its ignition sequence until the burner is established.
10. If the boiler does not light after 5 attempts the boiler will lock out and display fault code L-2 constantly. Reset the boiler (Refer to Frame 37). The boiler will repeat its ignition sequence. If reset occurs 5 times within 15 minutes then L-5 will be shown. If power is removed this will be reset.

    When the burner is established the BLUE 'Burner On' neon (D) will be illuminated, the LED display (C) will show status **C.**

11. Ensure that with the boiler operating the dynamic gas pressure is able to obtain maximum output. Refer to Table 2.

IMPORTANT

The gas input to the burner is regulated by the gas valve according to the air flow produced by the fan. It is NOT user-adjustable. Any interference to sealed settings on the gas valve will adversely affect operation and render our warranty void.

For additional gas supply information refer to "Gas Supply" on page 8.

THE DISPLAY

The user control has one neon and one display to inform the user about the status. The display will show the status of the boiler. The neon will show the status of the flame. If no flame is detected the neon is off. When the flame is detected the neon will be lit permanently.

Below is a list with display function in normal operation.

- 0 Standby, no demand for heat present.
- c Boiler is active for central heating or hot water.
- F Boiler is active for boiler frost protection.
- L Boiler is in lockout for a specific error. Display will be blinking, alternating with a number or letter to show which error is detected.
- F Boiler has a fault for a specific error. Display will be blinking, alternating with a number or letter to show which error is detected.

Note: Boiler frost protection - boiler fires if temperature is below 5 degrees C.

Note. The boiler incorporates a fan overrun cycle which MUST NOT be prematurely interrupted by isolation of the mains electricity supply.

34 GENERAL CHECKS **Make the following checks for correct operation:**

CENTRAL HEATING (CH) MODE

1. Ensure that the CH external controls are calling for heat.

   The display should read: c ☼
2. Check the boiler gas rate when the boiler is at full output.

   Check at the gas meter, with no other appliance in use. Refer to Table 2 for gas rate.
3. Set the central heating external controls to OFF. The burner should go off and the pump continue to run for 4 minutes

   The display should read: 0
4. Check the correct operation of the timer and all other system controls. Operate each control separately and check that the main burner responds.

WATER CIRCULATION SYSTEM

1. With the system COLD, check that the initial pressure is correct to the system design requirements.

   For pre-pressurised systems, this should be 1.0 bar.
2. With the system HOT, examine all water connections for soundness. The system pressure will increase with temperature rise but should not exceed 2.5 bar.
3. With the system still hot, turn off the gas, water and electricity supplies to the boiler and drain down to complete the flushing process.

Note: *A flushing solution should be used during the flushing procedure. Flushing solutions: Fernox Superfloc, Sentinel X300 (new systems) or X400 (existing systems). Refer to Frame 4.*

4. Refill and vent the system, add inhibitor (see Frame 4), clear all air locks and again check for water soundness.
5. Reset the system initial pressure to the design requirement.
6. Balance the system. Refer to Frame 3.
7. Check the condensate drain for leaks and check that it is discharging correctly.
8. Finally, set the controls to the User's requirements.

Note: *The pump will operate briefly as a self-check once every 24 hours in the absence of any system demand.*

WATER TEMPERATURES

Temperatures can be selected using the CH temperature control (A)

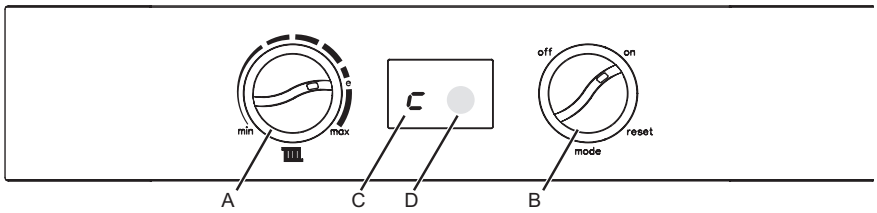
Knob Setting	CH Flow Temp ºC (ºF)
Max	80 (176)
Min	30 (86)

35 RESET PROCEDURE

To reset boiler, turn the mode control knob (B) to reset position and immediately turn knob back to required setting. The boiler will repeat the ignition sequence.

Legend

- **A.** CH temperature control
- **B.** Mode Control Knob
- **C.** Boiler Status
- **D.** Burner 'on' indicator



36 HANDING OVER

After completing installation and commissioning of the system the installer should hand over to the householder by the following actions:

1. Hand the User Instructions to the householder and explain his/her responsibilities under the relevant national regulations.
2. Explain and demonstrate lighting and shut down procedures.
3. The operation of the boiler and the use and adjustment of all system controls should be fully explained to the householder, to ensure the greatest possible fuel economy consistent with the household requirements of both heating and hot water consumption.

   Advise the User of the precautions necessary to prevent damage to the system and the building, in the event of the system remaining inoperative during frosty conditions.
4. Explain the function and the use of the boiler heating controls.
5. Explain the function of the boiler fault mode.

   Emphasise that if a fault is indicated refer to "Fault Codes" in the User Guide.
6. Explain and demonstrate the function of time and temperature controls, radiator valves etc., for economic use of the system.
7. If a timer is fitted draw attention to the timer Users Instructions and hand them to the householder.
8. Loss of system water pressure

   Explain that the dial underneath the boiler indicates the central heating system pressure and that if the normal COLD pressure of the system is seen to decrease over a period of time then a water leak is indicated. Explain the re-pressurising procedure and if unable to re-pressurise or if the pressure continues to drop a registered local heating installer should be consulted.
9. Explain Boiler reset procedure.
10. After installation and commissioning please complete the Benchmark Commissioning Checklist before handover to the customer. For IE, its is necessary to complete a "Declaration of Conformity" to indicate compliance to I.S. 813:2002.

IMPORTANT

11. A comprehensive service should be carried out ANNUALLY.

    Stress the importance of regular servicing by a Gas Safe Registered Engineer. In IE servicing work must be carried out by a Registered Gas Installer (RGII).
12. Inform the householder of the guarantee/registration found within the envelope pack and the requirement to register it to receive the full benefit of the warranty.

37 SERVICING SCHEDULE

For the very latest copy of literature for specification & maintenance practices, visit our website www.keston.co.uk, where you will be able to download the relevant information. .

WARNING. **Always turn OFF the gas supply at the gas service cock, and switch OFF and disconnect the electricity supply to the appliance before servicing.**

Combustion testing must be carried out by a competent person using a combustion analyser conforming to BS7927.

To ensure the continued safe and efficient operation of the appliance it is recommended that it is checked at regular intervals and serviced as necessary. The frequency of servicing will depend upon the installation condition and usage but should be carried out at least annually.

It is the law that any service work must be carried out by a Gas Safe Registered Engineer. In IE service work must be carried out by a Registered Gas Installer (RGII).

INSPECTION

1. Light the boiler and carry out a pre-service check, noting any operational faults.
2. Check the flue terminal (and terminal guard if fitted) is undamaged and clear of any obstruction.
3. Check all water and gas joints for signs of leakage. Remake any suspect joints ensuring a gas tightness check is carried out if applicable and the water system is correctly refilled, vented and re-pressurised.

CLEANING PROCEDURE

Note. In order to carry out either servicing or replacement of components the boiler front panel must be removed. Refer to Frame 38.

1. Clean the main burner. Refer to Frame 40.
2. Clean the heat exchanger & condensate trap/siphon. Refer to Frames 42 & 41.
3. Check the main injector for blockage or damage. Refer to Frame 46.
4. Check that the flue terminal is unobstructed and that the flue system is sealed correctly.

The cleaning procedures are covered more fully in Frames 40-44 and MUST be carried out in sequence.

IMPORTANT.

6. After completing the servicing or exchange of components always test for gas tightness.
7. When work is complete the front panel MUST be correctly refitted, ensuring that a good seal is made.

Do NOT OPERATE the boiler if the front panel is not fitted.

8. If, for any reason, the condensate trap/siphon has been removed ensure the trap is refilled with water before reassembling.
9. Check the gas consumption.
10. Check combustion by connecting the flue gas analayser to the flue gas sampling point as shown in the diagram and measure CO & CO_2.

    If the CO/CO_2 ratio is greater than 0.004 AND the integrity of the complete flue system and combustion circuit seals have been verified and the inlet gas pressure (and gas rate) have been verified, then contact Keston.
11. Complete the service section in the Benchmark Commissioning Checklist.

GENERAL

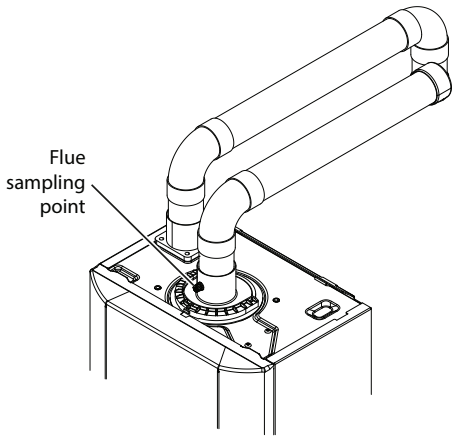
Please Note: During routine servicing, and after any maintenance or change of part of the combustion circuit, the following must be checked:

- The integrity of the flue system and the flue seals,
- The integrity of the boiler combustion circuit and the relevant seals
- The operational (working) gas inlet pressure at maximum rate.
- The gas rate
- The combustion performance.

COMPETENCE TO CARRY OUT THE CHECK OF COMBUSTION PERFORMANCE

Please Note: BS 6798:2009 Specification for installation and maintenance of gas-fired boilers of rated input not exceeding 70kW net advises that:

- The person carrying out a combustion measurement should have been assessed as competent in the use of a flue gas analyser and the interpretation of the results.
- The flue gas analyser used should be one meeting the requirements of BS7927 or BS-EN50379-3 and be calibrated in accordance with the analyser manufacturers requirements, and
- Competence can be demonstrated by satisfactory completion of the CPA1 ACS assessment, which covers the use of electronic portable combustion gas analysers in accordance with BS7967, Parts 1 to 4.



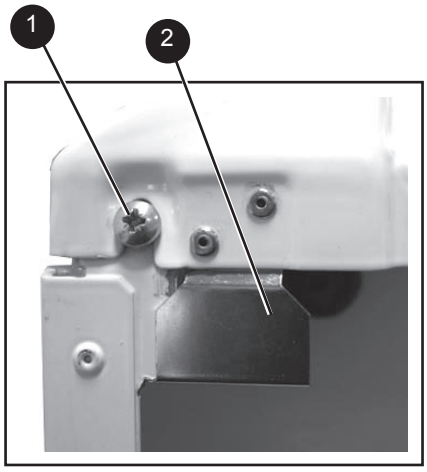
38 BOILER FRONT PANEL REMOVAL / REPLACEMENT

REMOVAL

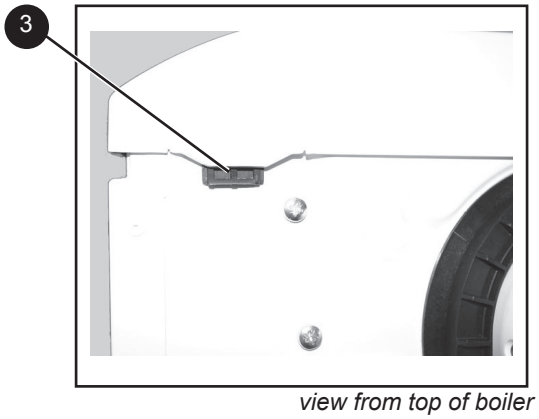
1. Loosen the two screws retaining the front panel.
2. Pull the two spring clips down to disengage and pull panel forward and upward and remove.

REPLACEMENT

3. Hook the panel onto the top retaining clips.
4. Push the panel until the 2 bottom spring clips engage ensuring the 4 control knobs line up with the holes in the front panel.
5. Re-tighten the two retaining screws.



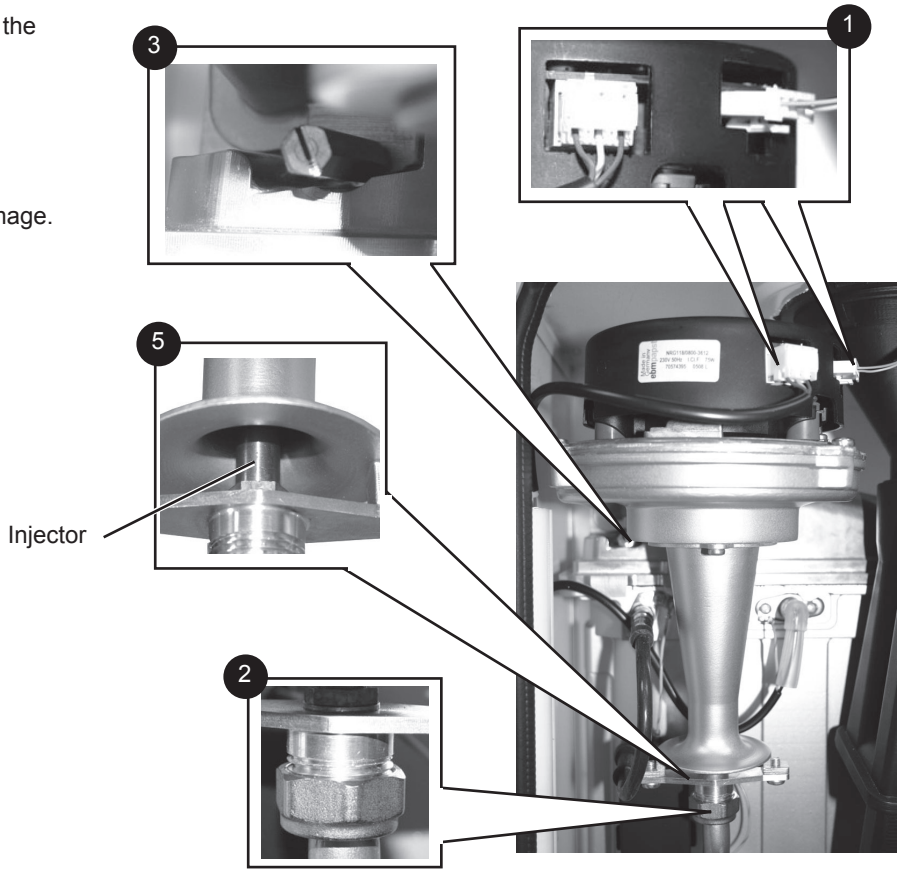
view from bottom of boiler



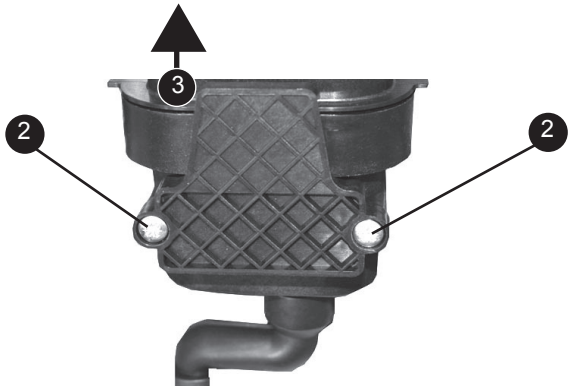
view from top of boiler

39 FAN AND VENTURI ASSEMBLY REMOVAL AND CLEANING

1. Disconnect the electrical leads from the fan.
2. Undo the gas pipe union connection to the injector housing.
3. Remove the extended nut on the fan mounting bracket.
4. Lift off fan and venturi assembly.
5. Inspect the injector for blockage or damage.
6. Inspect fan outlet sealing gasket and replace if necessary.



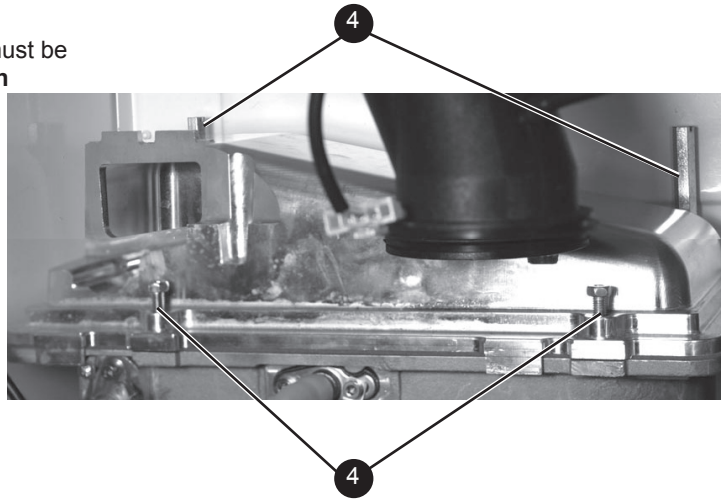
40 BURNER REMOVAL AND CLEANING



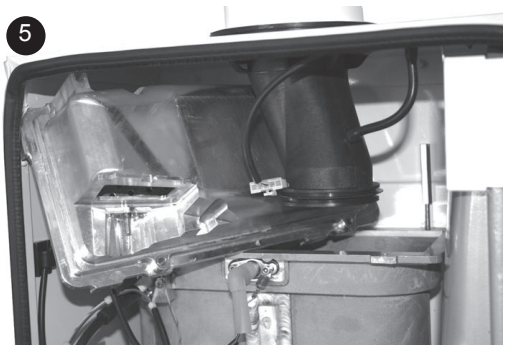
1. Ensure the sump is fully drained
2. Undo the two screws and remove the sump cover retaining the lower flue manifold.
3. Lift the manifold to clear the bottom sealing gasket and remove manifold.
4. Remove the 2 burner front fixing screws and loosen the 2 rear extended nuts by at least ten turns.
5. Lift off the burner from the combustion chamber. To facilitate the removal angle the burner as shown.

IMPORTANT

The burner head is a ceramic plaque construction. Care must be taken to ensure that **the burner is not placed down upon its face** as this may cause damage to the ceramic.



6. Brush off any deposits that may be on the ceramic with a SOFT brush.
7. Inspect the sealing gasket around the burner for any signs of damage. Replace as necessary.



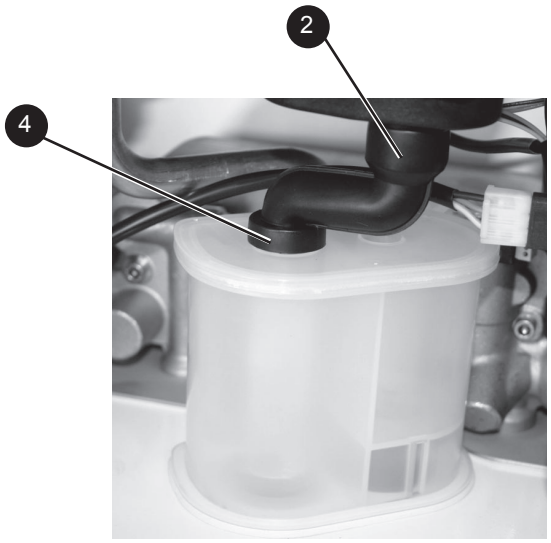
41 CLEANING THE CONDENSATE TRAP/SIPHON

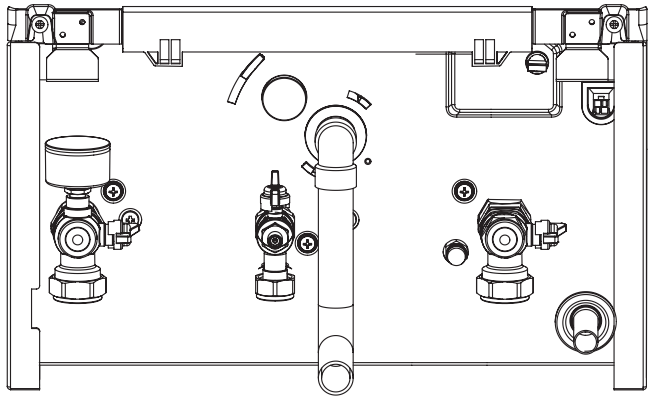
1. Pull off the rubber pipe at the sump drain.
2. Disconnect the condensate drain pipe.
3. Turn the siphon clockwise to disengage and lift to remove.

Note. Keep siphon upright when removing

4. Clean siphon with water.
5. Re-assemble in reverse order.

B When re-assembling ensure the trap is full of water.



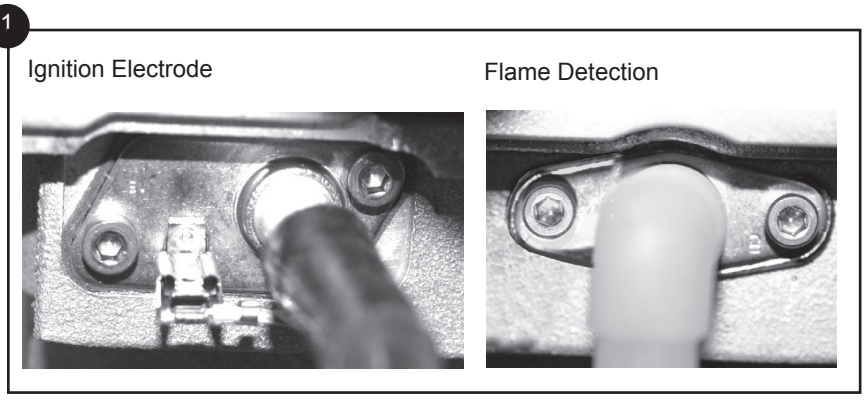


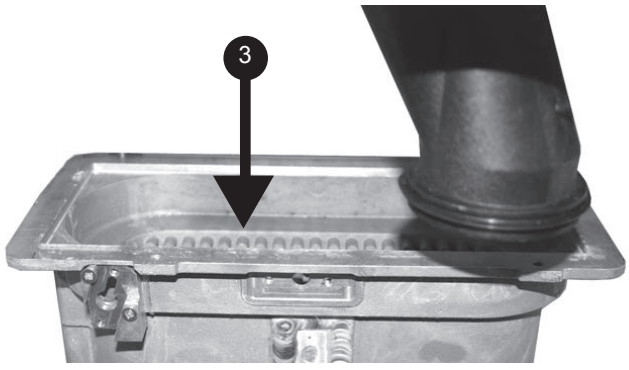
SERVICING

42 CLEANING THE HEAT EXCHANGER

Note: **Ensure the condensate trap/siphon is fully drained before cleaning.** Refer to Frame 55.

1. Remove ignition and flame detection electrodes. Refer to Frames 51 & 52.
2. It is advisable to replace the sump cover prior to the water flush process.
3. Thoroughly flush the heat exchanger by pouring water into the top of the combustion chamber ensuring the full top area is covered.
4. Remove the sump cover and clean loose deposits from the sump.
5. Inspect the ignition and detection electrodes. Ensure that they are clean and in good condition - replace if necessary.
6. Re-fit the ignition and flame detection electrodes, ensuring that both earth tabs are fitted to ignition electrode.
7. Check that the ignition and detection gaps are correct. Refer to Frames 51 & 52.



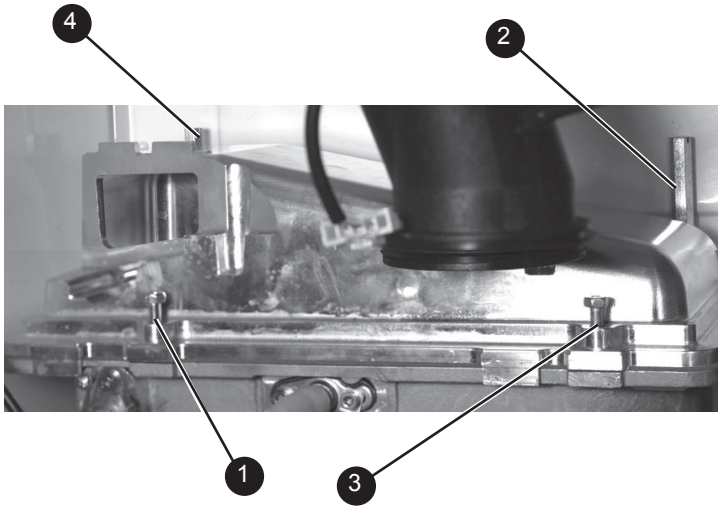


43 REASSEMBLY

Reassemble the boiler in the following order:

1. Ensure that the condensate trap/siphon is full of water.
2. Refit the burner ensuring the sealing gasket is correctly positioned and free from damage (tighten the 4 fixing screws in the sequence shown below).
3. Refit the fan / venturi assembly ensuring the retaining tabs are correctly positioned and the sealing gasket is correctly positioned and free from damage.
4. Reconnect the fan electrical leads.
5. Remove the sump cover and refit the lower flue manifold as shown.
6. Refit the sump cover.
7. Refit the boiler front panel.

   IMPORTANT. Ensure that the boiler front panel is correctly fitted and that a good seal is made.
8. Swing the control box back into its working position and secure.
9. Turn on the gas supply at the gas service cock.
10. Reconnect the electrical supply.
11. Check the operation of the boiler. refer to Frame 32-34



44 REPLACEMENT OF COMPONENTS

GENERAL

When replacing ANY component

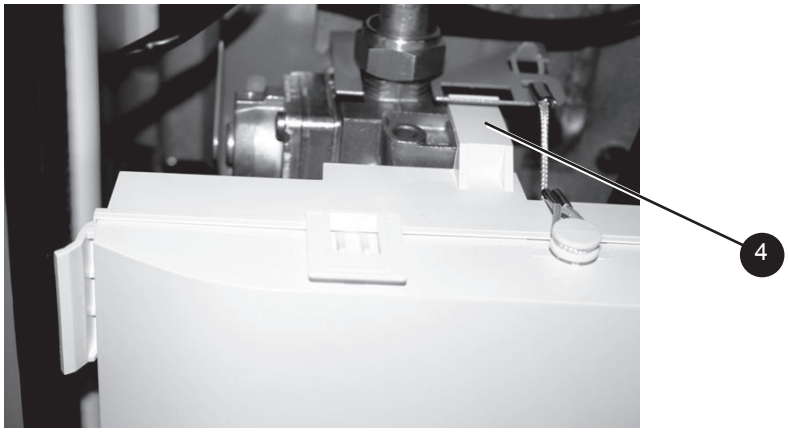
1. Isolate the electricity supply.
2. Turn off the gas supply.
3. Remove the boiler front panel. Refer to Frame 38.
4. Release the retaining clip and swing the control box down into its servicing position.

After replacing ANY component check operation of the boiler, including gas soundness, gas rate and combustion test.

IMPORTANT.
When work is complete, the front panel must be correctly refitted - ensuring that a good seal is made.

Notes.

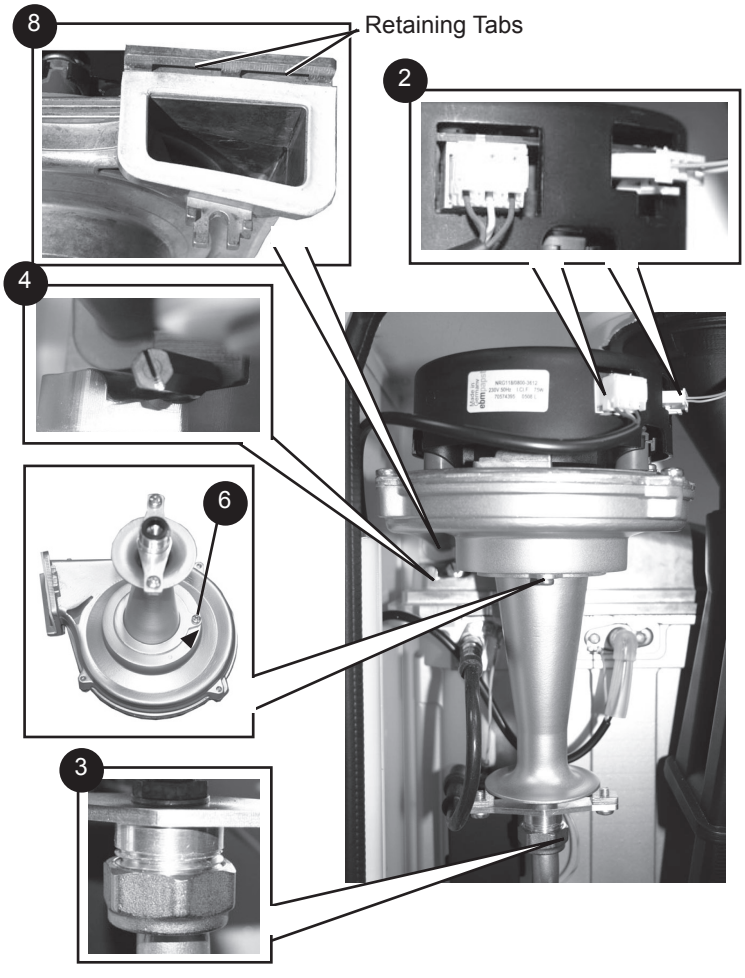
1. *In order to assist fault finding, the control panel has an LED diagnostic display. The key to boiler fault conditions is shown in Frame 67.*
2. *In order to replace components in Frames 58-64 it is necessary to drain the boiler. Refer to Frame 57.*



THE BOILER MUST NOT BE OPERATED WITHOUT THE FRONT PANEL FITTED

45 FAN REPLACEMENT

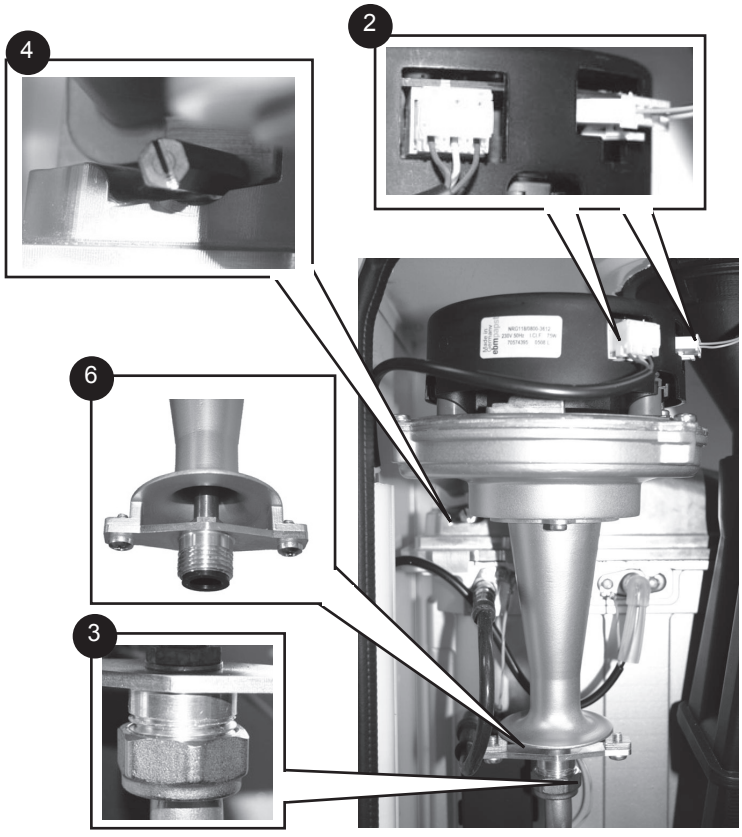
1. Refer to Frame 44.
2. Disconnect the electrical leads from the fan.
3. Undo the gas pipe union connection to the injector housing.
4. Remove the extended nut retaining the fan mounting bracket.
5. Lift and remove the fan and venturi assembly.
6. Remove the screw and twist venturi anti-clockwise to remove venturi assembly, *noting the orientation of the venturi in relation to the fan body.*
7. Transfer the venturi assembly to the new fan, replacing the 'o' ring if evidence of damage or deterioration is visible.
8. Fit the new fan / venturi assembly ensuring the retaining tabs are correctly positioned and the fan outlet sealing gasket is correctly positioned and free from damage. Refit the extended nut.
9. Reassemble the boiler in reverse order, taking care not to overtighten the screw on the fan mounting bracket.
10. Check the operation of the boiler. Refer to Frames 32-34.



SERVICING

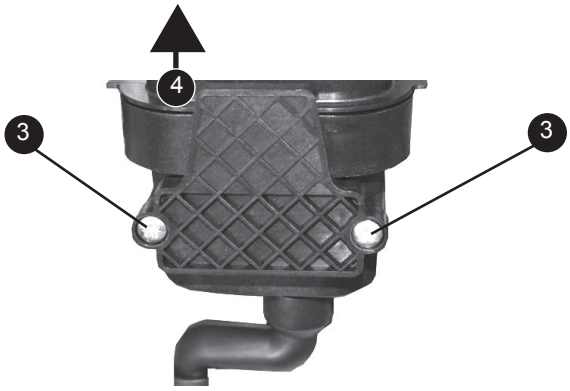
46 BURNER INJECTOR REPLACEMENT

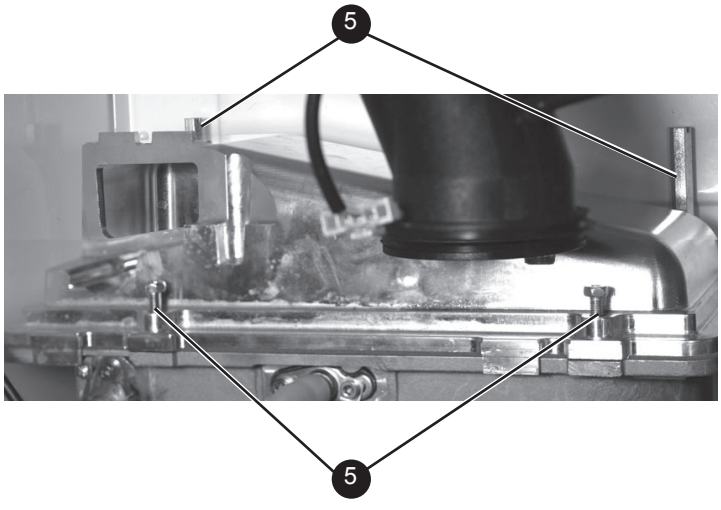
1. Refer to Frame 44.
2. Disconnect the electrical leads from the fan.
3. Undo the gas pipe union connection to the injector housing.
4. Loosen the screw retaining the fan mounting bracket.
5. Lift and remove the fan and venturi assembly.
6. Remove the 2 injector housing screws.
7. Withdraw the injector housing.
8. Fit the new injector housing complete with injector.
9. Reassemble in reverse order, ensuring that the new gas seal supplied is located correctly in the injector housing.
10. Check operation of the boiler. Refer to Frames 32-34.



47 BURNER REPLACEMENT

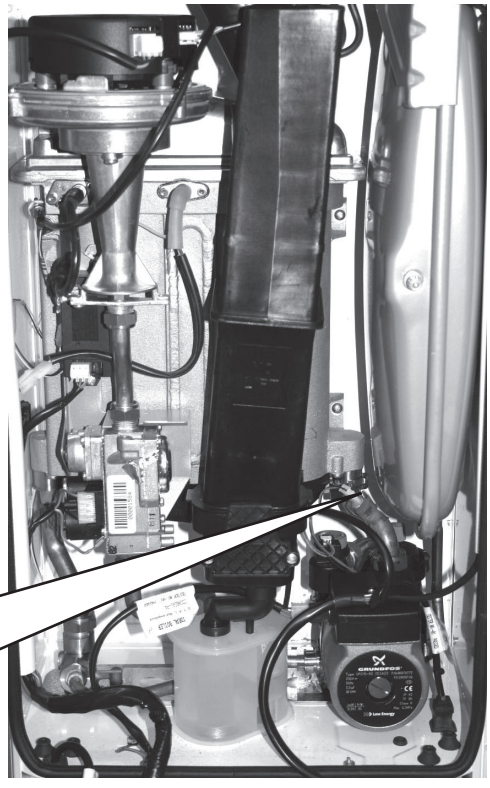
1. See Frame 40.
2. Refer to Frame 44.
3. Undo the two screws and remove the sump cover.
4. Lift the manifold to clear the bottom sealing gasket and remove manifold.
5. Remove the 2 front fixing screws and loosen the 2 rear extended nuts.
6. Lift off the burner from the combustion chamber. To facilitate the removal angle the burner as shown.
7. Fit the new burner, replacing any damaged or deteriorating sealing gasket.
8. Reassemble in reverse order. Refer to Frame 43.
9. Check the operation of the boiler. Refer to Frames 32-34.

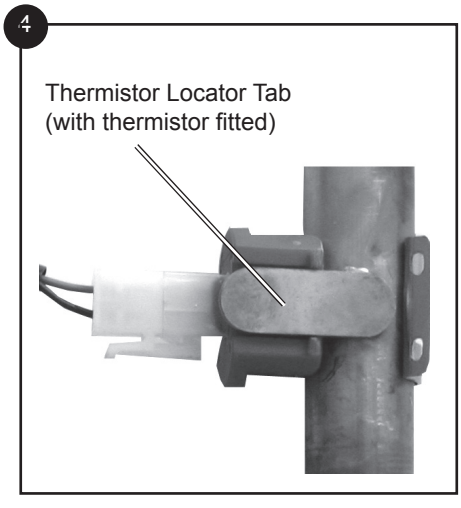


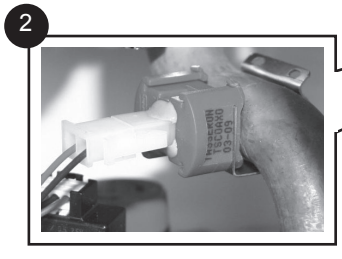


48 RETURN THERMISTOR RENEWAL

1. Refer to Frame 44.
2. Unclip the return thermistor from the return pipe and withdraw it from the boiler.
3. Disconnect the electrical leads from the thermistor.
4. Reconnect the electrical lead to the new thermistor and reassemble in reverse order, ensuring that the thermistor is securely fitted to the pipe on the thermistor locator tab as shown.
6. Check the operation of the boiler. Refer to Frames 32-34.

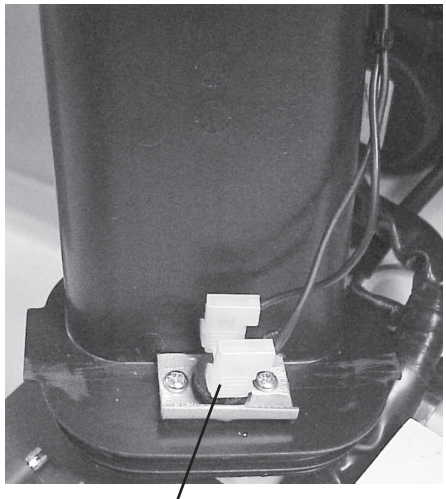






49 FLUE THERMOSTAT REPLACEMENT

1. Refer to Frame 43.
2. Undo the two screws and remove the sump cover plate.
3. Disconnect the two flag terminals from the flue thermostat.
4. Lift the manifold to clear the bottom sealing gasket and remove manifold.
   .
5. Unscrew the two M3.5 screws that connect the thermostat to the manifold.
6. Replace thermostat with new part and then refit the two screws, remembering to fit rubber gasket and sealing clamp.

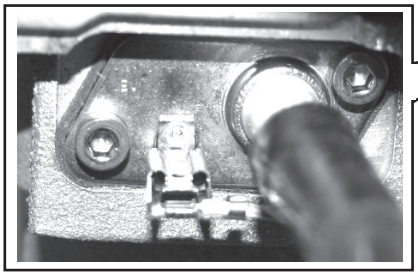


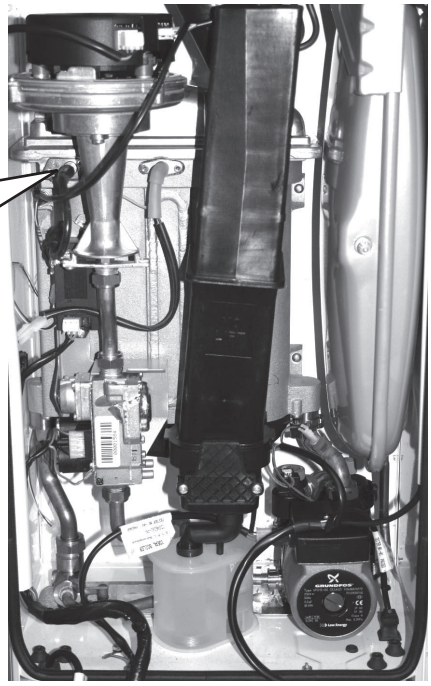
Flue Thermostat

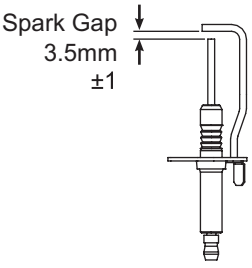
50 IGNITION ELECTRODE REPLACEMENT

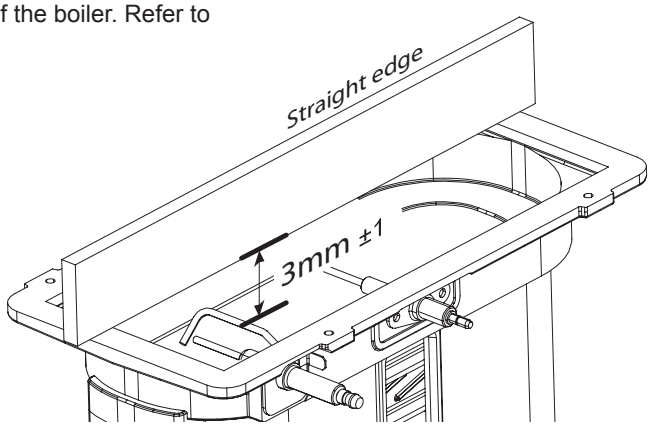
1. Refer to Frame 44.
2. Remove the burner. Refer to Frame 47.
3. Unplug the ignition lead from the electrode.
4. Remove the earth lead from the ignition electrode.
5. Remove the 2 screws holding the ignition electrode to the combustion chamber.
6. Remove the electrode.
7. Fit the new ignition electrode, using the new gasket supplied. Check dimensions as shown.
8. Reassemble in reverse order.
9. Check the operation of the boiler. Refer to Frames 32-34.

Ignition Electrode





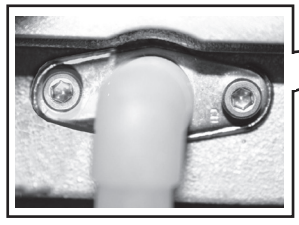


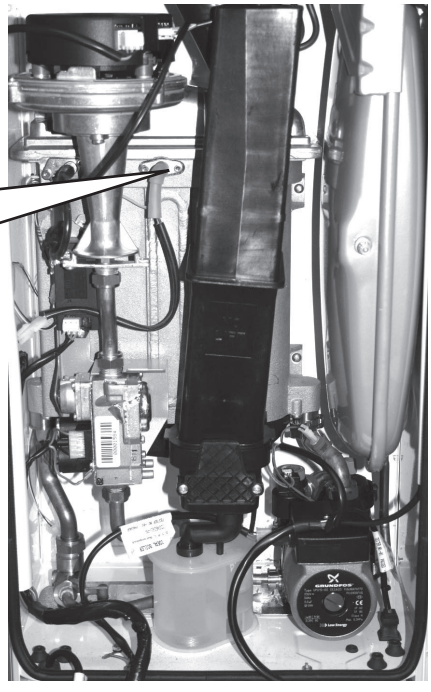


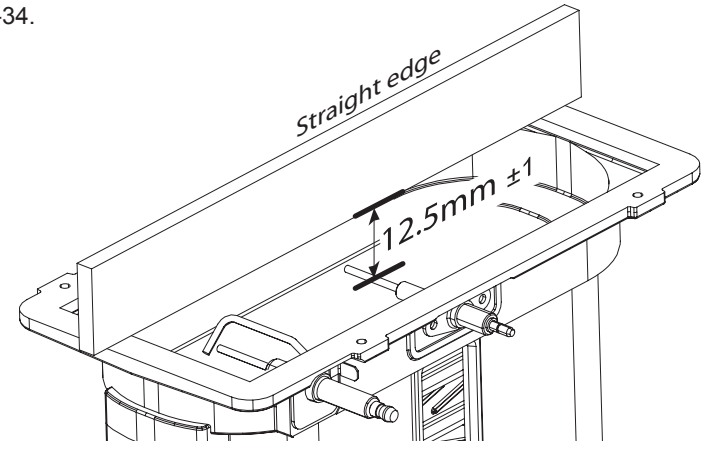
51 FLAME DETECTION ELECTRODE REPLACEMENT

1. Refer to Frame 44.
2. Remove the burner. Refer to Frame 47.
3. Unplug the flame detection lead from the electrode.
4. Remove the 2 screws retaining the detection electrode.
5. Remove the electrode.
6. Fit the new flame detection electrode, using the new gasket supplied.
7. Reassemble in reverse order.
8. Check the operation of the boiler. Refer to Frames 32-34.

Flame Detection Electrode



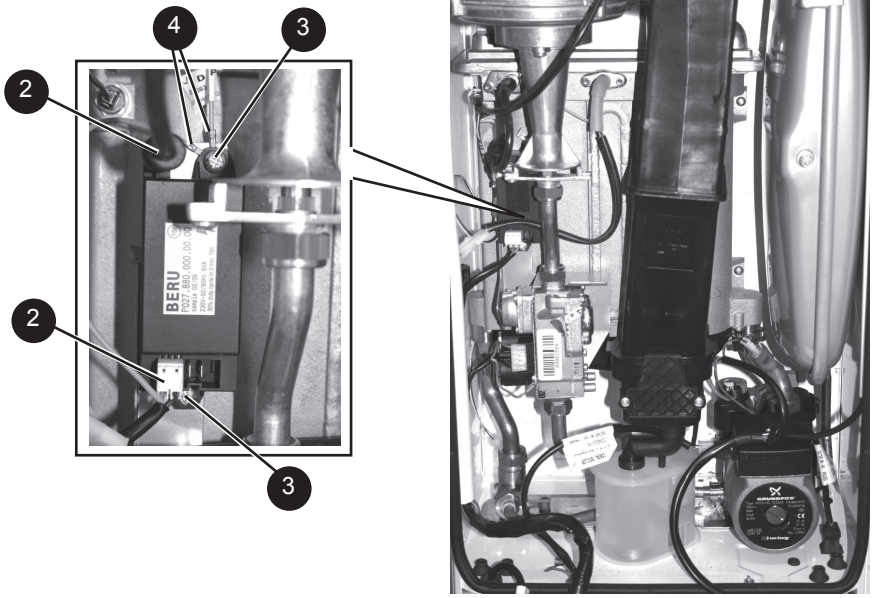




52 SPARK GENERATOR REPLACEMENT

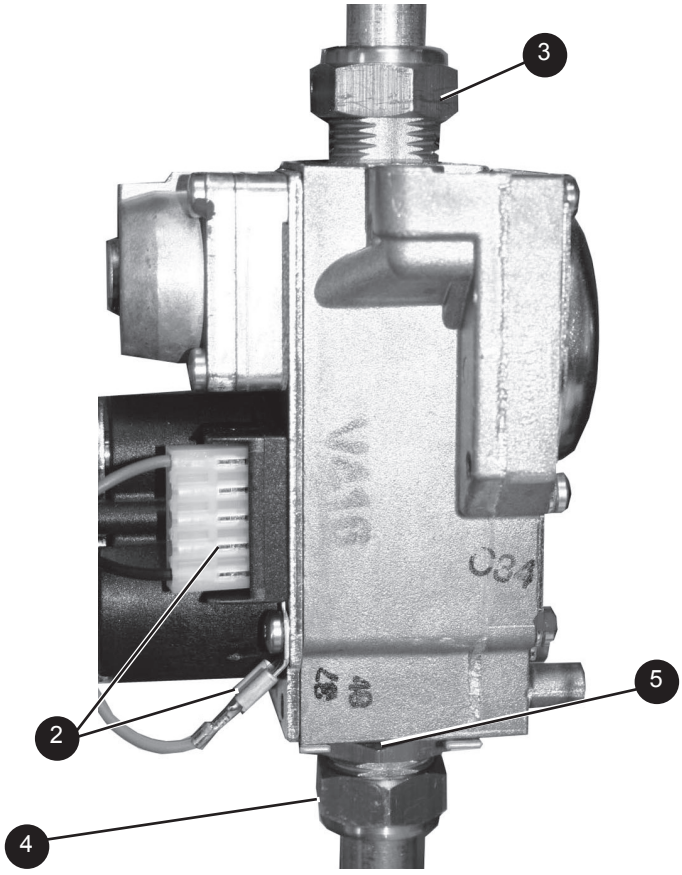
1. Refer to Frame 44.
2. Disconnect the leads from the spark generator.
3. Remove the M5 screws securing the spark generator to the boiler chassis.
4. Fit the new spark generator and re-assemble in reverse order ensuring the two earth leads are correctly replaced.
5. Check operation of the boiler. Refer to Frames 32-34.

Spark Generator



53 GAS CONTROL VALVE REPLACEMENT

1. Refer to Frame 44.
2. Unplug the electrical lead connection from the gas control valve and disconnect the earth wire.
3. Undo the union nut on the outlet of the gas control valve.
4. Undo the gas inlet pipe union at the inlet to the gas control valve.
5. Loosen the back nut retaining the valve to the bracket and withdraw the valve forwards.
6. Fit the new gas control valve ensuring the two sealing washers are in place and reconnect gas and electrical connections.
7. Check operation of the boiler. Refer to Frames 32-34.

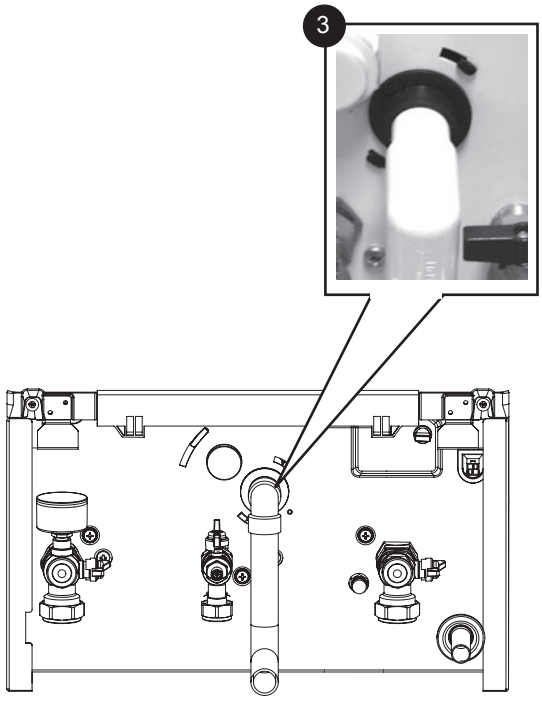


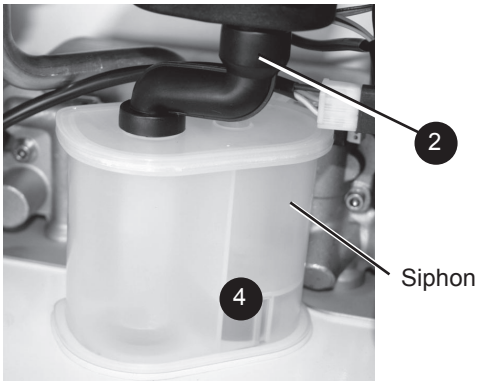
54 CONDENSATE TRAP/SIPHON REPLACEMENT

1. Refer to Frame 44.

Note: *Ensure condensate trap is fully drained before removal.*

2. Pull off the rubber pipe at the sump drain.
3. Disconnect the condensate drain pipe.
4. Turn the siphon clockwise to disengage and lift to remove.
5. Reassemble in reverse order.
6. When reassembling ensure the trap is full of water.
7. Check operation of the boiler. Refer to Frames 32-34.





55 MAIN PCB REPLACEMENT

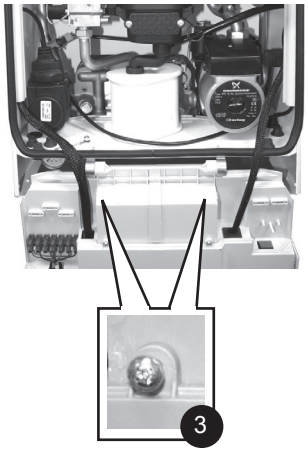
Note that production boiler PCBs are factory pre-set to operate for boiler range and output, but when ordering Primary PCB as a spare, an additional Boiler Chip Card (BCC) MUST also be purchased for your specific boiler range and output.

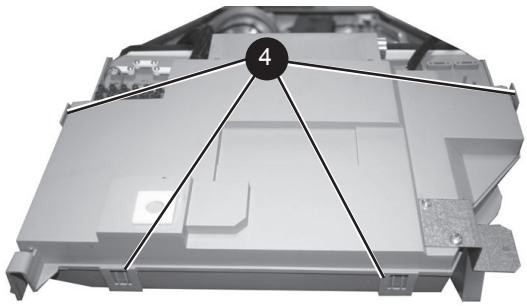
Note. *Fit the earth strap provided with the PCB to your wrist and secure to a suitable earth on the boiler chassis.*

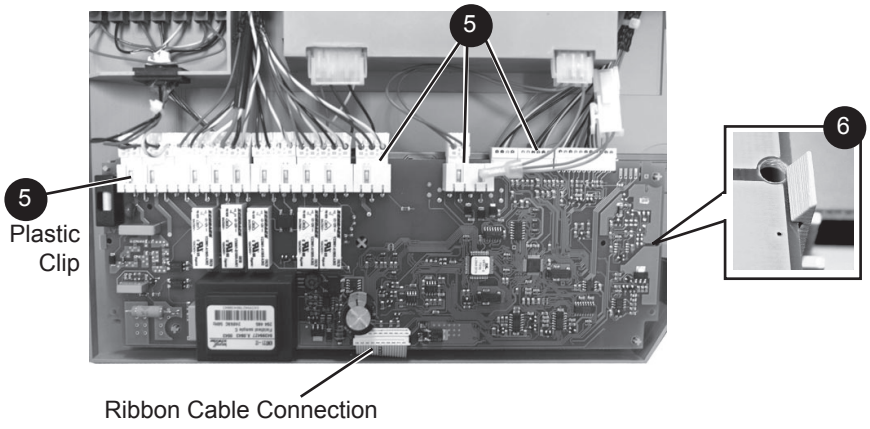
1. Refer to Frame 44.
2. Note the control knob positions.
3. Remove the 2 screws retaining the control box cover.
4. Carefully lift the 4 retaining clips and remove control box cover.
5. Unplug all lead connections to the PCB including the ribbon cable (to facilitate ribbon cable removal, ease side clips apart and pull upwards), also where applicable, push the small plastic clip with an electrical screwdriver to facilitate plug removal.
6. Spring out the two side retaining clips and pull the PCB upwards to clear the 4 corner retaining posts.
7. Take the new Primary PCB and attach the appropriate Boiler Chip Card (BCC)

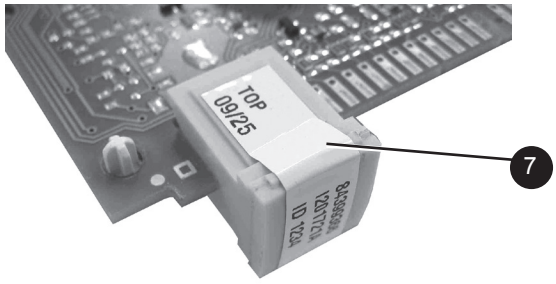
   Note. *Ensure the correct orientation of BCC by placing "TOP" side up as shown.*
8. Re-connect all plug connections.
9. Reassemble in reverse order.
10. Turn power back on to the boiler, after a few moments the display will start alternating between "F" and "0". Turn the reset knob fully clockwise and when the display shows " - " turn the knob fully anti-clockwise IMMEDIATELY.

    Finally move the knob into the required position.
11. Check operation of the boiler. Refer to Frames 32-34.





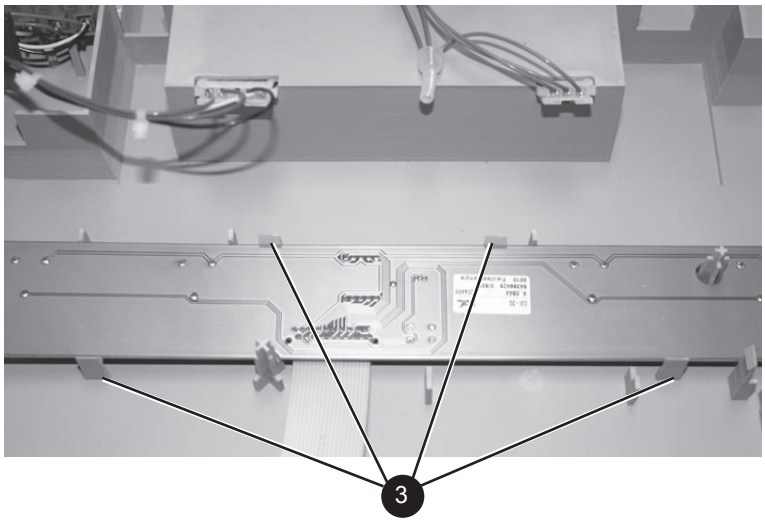




56 USER CONTROL PCB REPLACEMENT

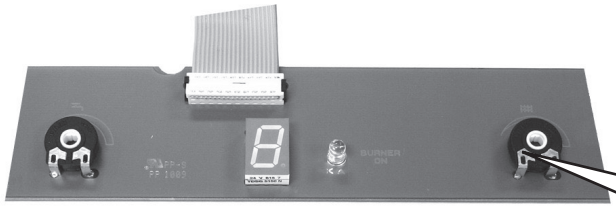
Note. *Fit the earth strap provided with the PCB to your wrist and a suitable earth on the boiler chassis.*

1. Refer to Frame 44.
2. Remove the main PCB, refer to Frame 55.
3. Unclip the PCB and lift to clear the mounting posts.
4. Fit the new PCB ensuring the 2 potentiometer spindles line up with the control knobs which must be in a vertical position.
5. Reassemble in reverse order.
6. Check operation of the boiler. Refer to Frames 32-34.

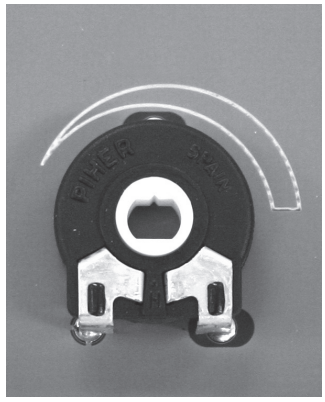


4

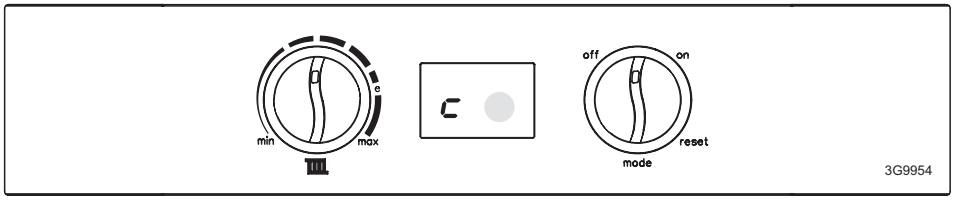
PCB



Potentiometer spindle



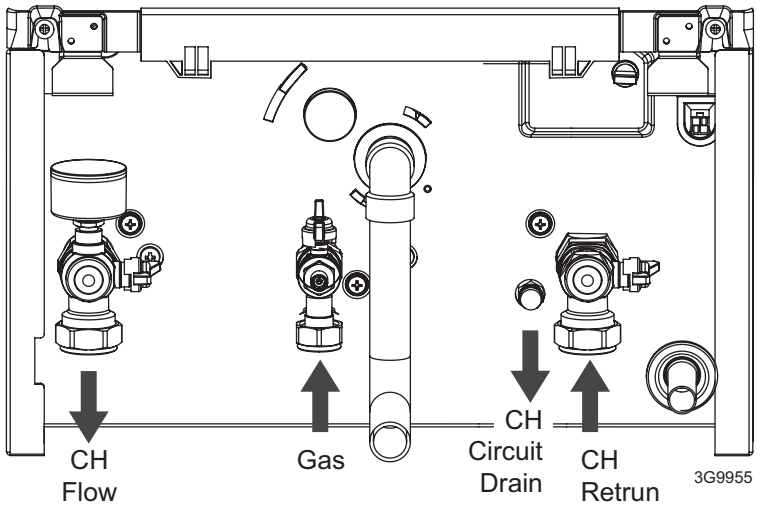
Control Knobs (to be in vertical position)



57 DRAINING THE BOILER

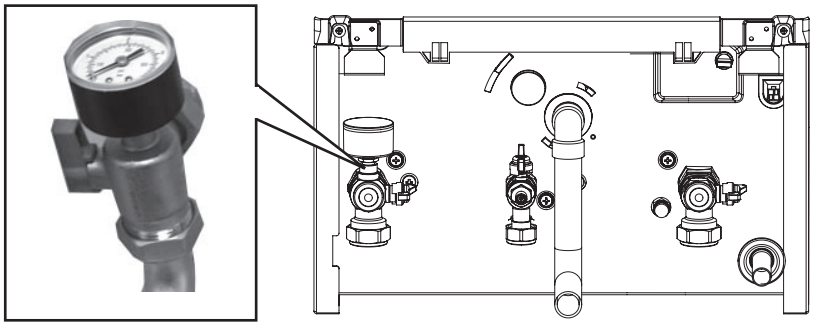
CENTRAL HEATING CIRCUIT

1. Refer to Frame 44.
2. Close all the CH water isolating valves on the boiler inlet.
3. To drain the primary heat exchanger circuit: Open the drain valve and attach a length of hose to the CH drain point.
4. After replacing any component on the boiler, remove the hose, close the drain valve and open all system isolating valves (re-pressurise as appropriate) before proceeding to check operation of the boiler.
5. Check operation of the boiler. Refer to Frames 32-34.



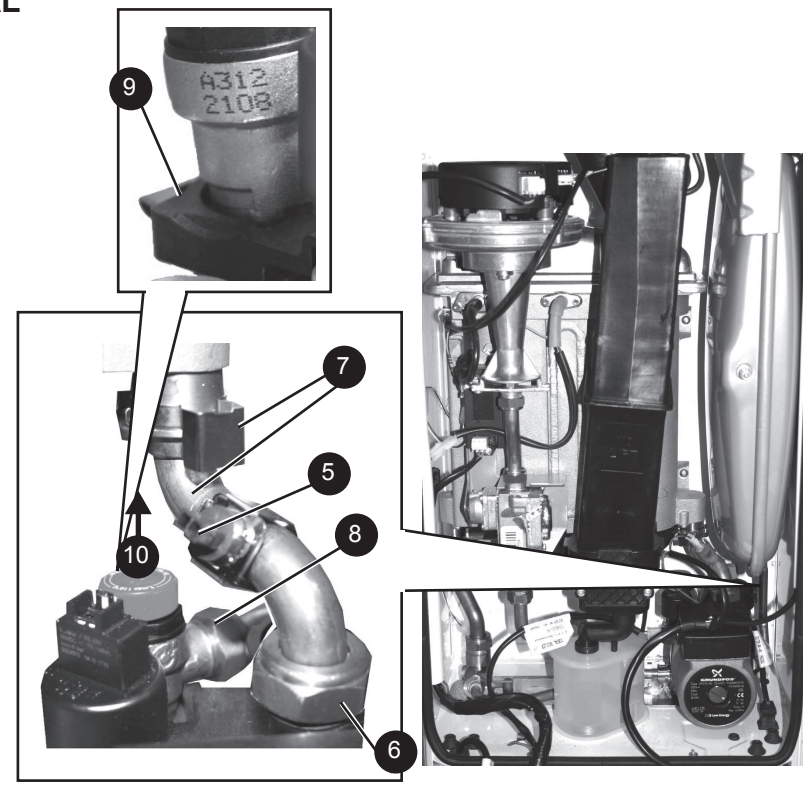
58 PRESSURE GAUGE RENEWAL

1. Refer to Frame 44.
2. Drain the heating system. Refer to Frame 57.
3. Unscrew the pressure gauge and discard.
4. Fit new pressure gauge, using suitable jointing compound.
5. Refill the boiler. Refer to Frame 22.
6. Check operation of the boiler. Refer to Frames 32-34.



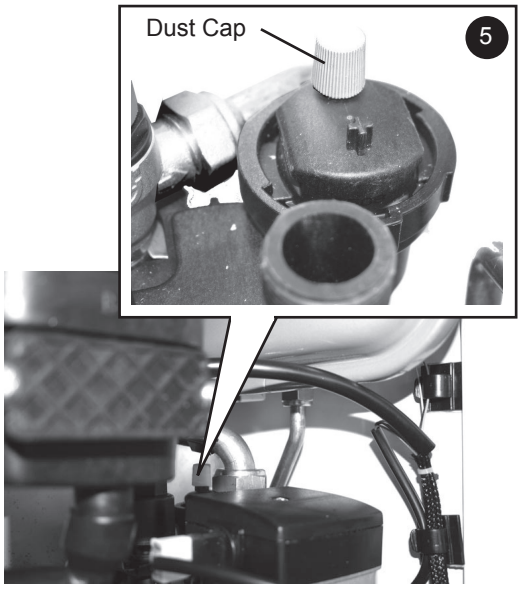
59 SAFETY RELIEF VALVE RENEWAL

1. Refer to Frame 44.
2. Drain the boiler. Refer to Frame 57.
3. Remove the condensate trap/siphon. Refer to Frame 54.
4. Remove expansion vessel. Refer to Frame 65.
5. Disconnect the electrical connection from the return thermistor.
6. Disconnect the 22mm pipe connection at the rear of the pump outlet.
7. Pull off the clip retaining the pipe to the heat exchanger swing the pipe to clear the pump and remove pipe.
8. Undo the safety valve union connection.
9. Withdraw the clip securing the safety valve.
10. Lift safety valve from boiler.
11. Fit the new safety valve and reassemble in reverse order ensuring the new 'o' ring is fitted to the top of the return pipe.
12. Refill boiler. Refer to Frame 22. Check operation of boiler. Refer to Frames 32-34.



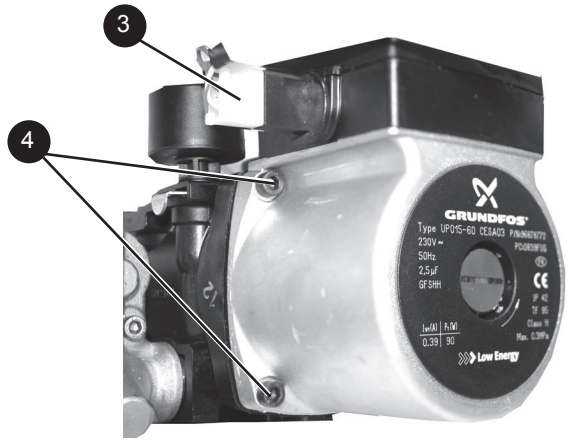
60 PUMP AUTOMATIC AIR VENT REPLACEMENT

1. Refer to Frame 44.
2. Drain the boiler. Refer to Frame 57.
3. Remove the expansion vessel. Refer to Frame 65.
4. Firstly, increase access area by disconnecting the 22mm pipe connection at top of pump chamber and bottom of heat exchanger and remove pipe Refer to Frame 59 (no's 5,6 & 7).
5. The automatic air vent head is retained in the pump body with a bayonet connection. The air vent head and float assembly is removed by turning the head anti-clockwise (viewed from above) and pulling upwards.
6. Reassembly is the reverse of the above. Ensure the air vent head 'o' ring seal is in place when refitting and the new 'o' ring is fitted to the return pipe top connection.
7. Ensure the air vent cap is loose.
8. Refill the boiler. Refer to Frame 22. Check for leaks around the new air vent joint.
9. Check the operation of the boiler. Refer to Frames 32-34.



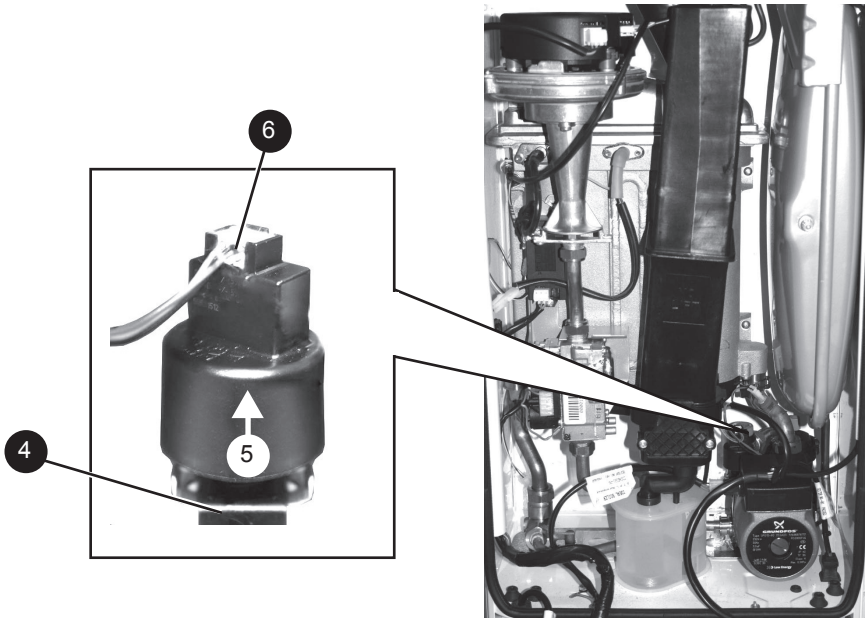
61 PUMP HEAD REPLACEMENT

1. Refer to Frame 44.
2. Drain the boiler. Refer to Frame 57.
3. Disconnect the electrical lead from the pump.
4. Remove the 4 Allen screws retaining the pump head.
5. Remove the pump head.
6. Fit the new pump head.
7. Reassemble in reverse order.
8. Refill the boiler. Refer to Frame 22.
9. Check operation of the boiler. Refer to Frames 35, 32-34.



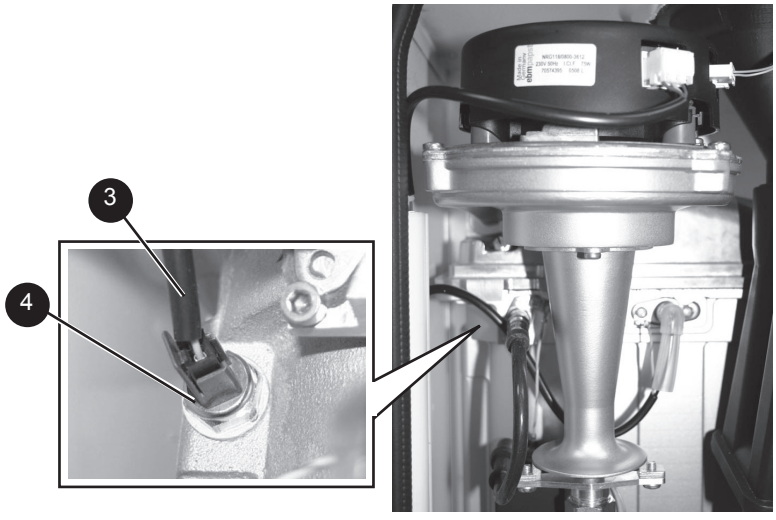
62 CH WATER PRESSURE SENSOR REPLACEMENT

1. Refer to Frame 44.
2. Drain the boiler. Refer to frame 57.
3. Remove condensate trap/siphon. Refer to Frame 54.
4. Using a suitable tool pull out the retaining clip.
5. Pull the pressure sensor upwards to remove.
6. Unplug the electrical connection and transfer to the new pressure sensor.
7. Push the new pressure sensor onto the rear pump housing and fit retaining clip.
8. Reassemble in reverse order.
9. Refill the boiler. Refer to Frame 22.
10. Check Operation of the boiler. Refer to Frames 32-34.



63 CONTROL / NO FLOW THERMISTOR REPLACEMENT

1. Refer to Frame 44.
2. Drain down the boiler. Refer to Frame 57.
3. Unplug the electrical lead.
4. Unscrew the thermistor (to facilitate removal a 13mm socket spanner should be used).
5. Fit the new thermistor using the sealing washer provided.
6. Reassemble in the reverse order.
7. Refill the boiler. Refer to Frame 22.
8. Check the operation of the boiler. Refer to Frames 32-34.



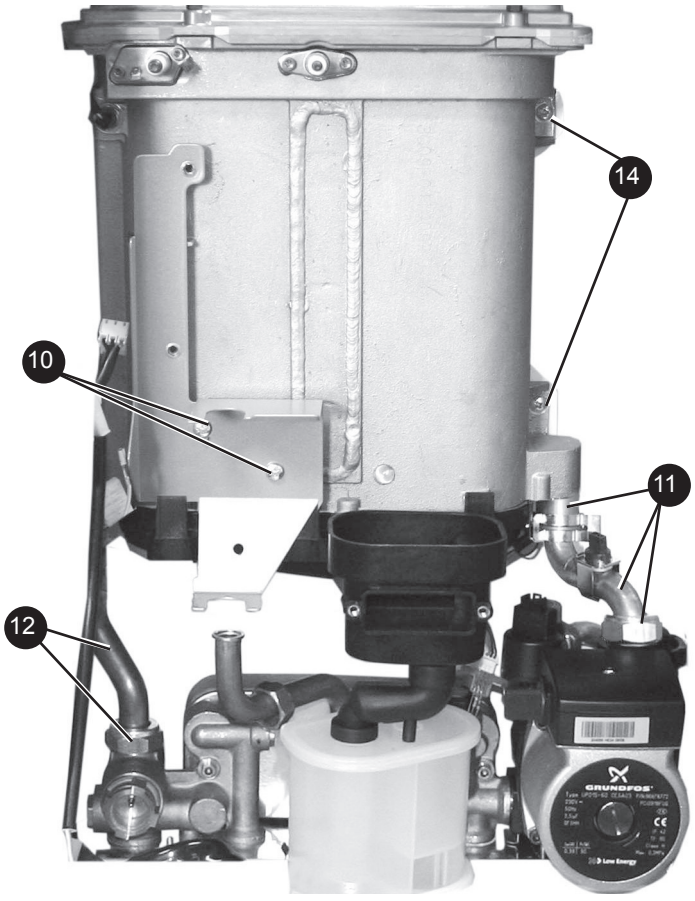
64 HEAT ENGINE RENEWAL

Refer also to Frame 5 - 'Boiler Exploded View'

IMPORTANT

Before starting the removal procedure, protect the gas and electrical controls with a waterproof sheet or plastic bag.

1. Refer to Frame 44.
2. Drain the boiler. Refer to Frame 57.
3. Remove the fan / venturi assembly and place on one side. Refer to Frame 45.
4. Remove the burner and place on one side. Refer to Frame 47.
5. Remove the ignition and detection electrodes. Refer to Frames 50 & 51.
6. Remove the spark generator. Refer to Frame 52.
7. Remove the gas valve. Refer to Frame 53.
8. Remove the expansion vessel. Refer to Frame 65.
9. Remove the control/no flow thermistor. Refer to Frame 63.
10. Remove the 2 M5 screws retaining the gas valve mounting bracket and transfer bracket to the new heat exchanger.
11. Undo the inlet pipe union nut and remove the retaining spring clip and remove pipe.
12. Undo the flow pipe union nut and remove pipe.
13. Remove the condensate rubber pipe. Refer to Frame 54, no. 2.
14. Remove the two heat exchanger fixing screws.
15. Remove the Heat exchanger.
16. Reassemble in reverse order, ensuring the heat exchanger LH retaining bracket is correctly positioned. Replace any new 'o' rings supplied with new heat exchanger and replacing gaskets or seals if any sign of damage is evident. When replacing the spring clips located on both the flow and return pipe connections, ensure clip is oriented to correctly match connecting pipe diameters.
17. Ensure the trap/siphon is filled with water. Refer to Frame 55.
18. Refill the boiler. Refer to Frame 22.
19. Check operation of the boiler. Refer to Frames 32-34.



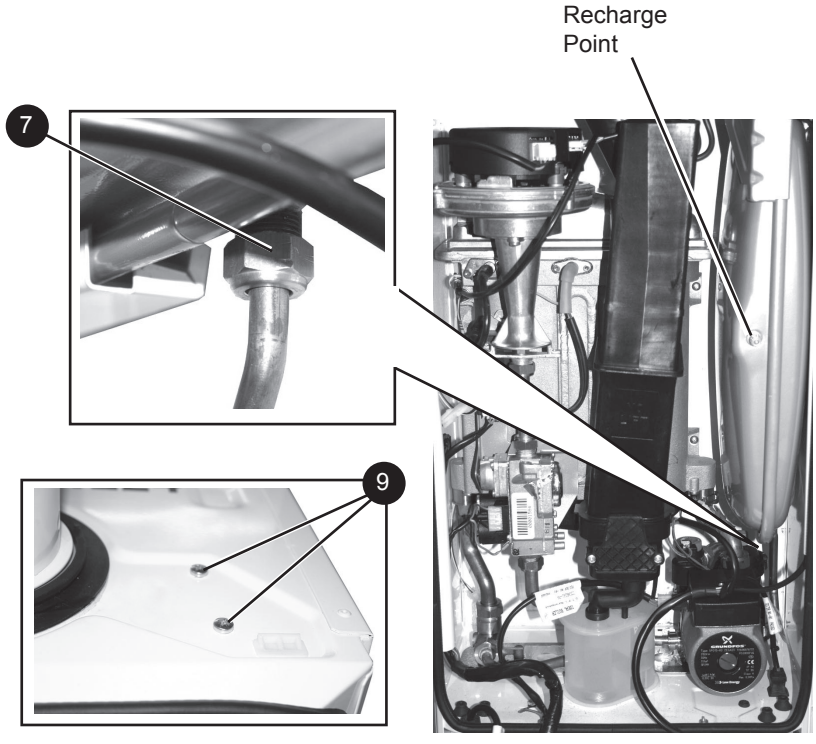
65 EXPANSION VESSEL RECHARGING & REPLACEMENT

RECHARGING

1. Remove the charge point cover.
2. Recharge the tank pressure to 0.75 bar.
3. Re-assemble in reverse order
4. Check operation of the boiler. Refer to Frames 32-34.

REPLACEMENT

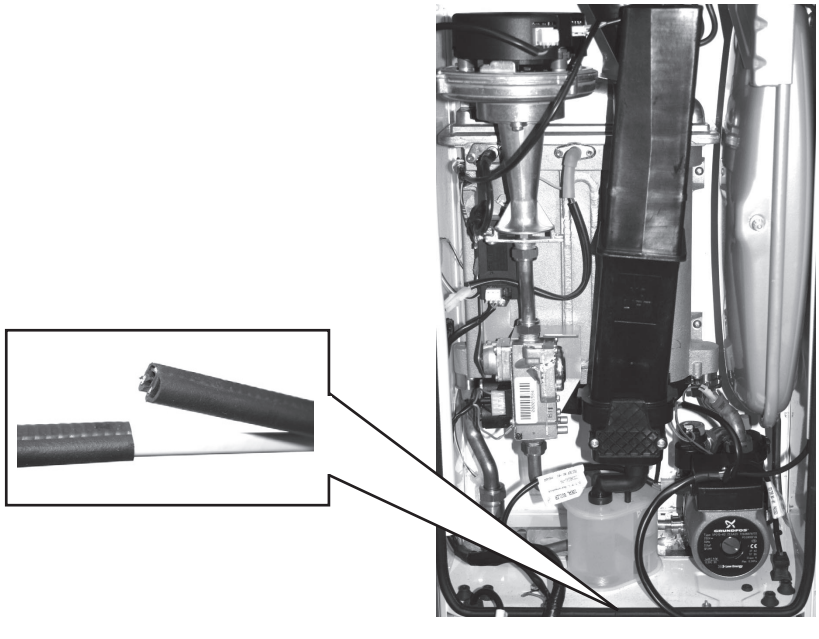
5. Refer to Frame 44.
6. Drain the boiler CH circuit. Refer to Frame 57.
7. Unscrew the union nut on the vessel water connection pipe.
8. Support the expansion vessel and unscrew the 2 screws from the securing clamp, located on the top of the boiler, and remove. (Note the position of the bracket on the vessel)
9. Remove the expansion vessel.
10. Fit the new expansion vessel.
11. Reassemble in reverse order.
12. Refill the boiler. Refer to Frame 22.
13. Check operation of the boiler. Refer to Frames 32-34.



66 BOILER SEALING PANEL SEAL REPLACEMENT

1. Refer to Frame 44.
2. Remove the old seal from the casing and thoroughly clean the casing surfaces.
3. Fit the new seal, ensuring the bottom joint provides an air tight seal.
5. Reassemble in reverse order.
6. Check operation of the boiler. Refer to Frames 32-34.

Note. *Ensure that the boiler front panel is correctly sealed, compressing the seal to make an airtight joint.*



67 FAULT FINDING CHART MAIN MENU

In order to assist fault finding the boiler has a 7 segment display. The key to the display codes is as follows:

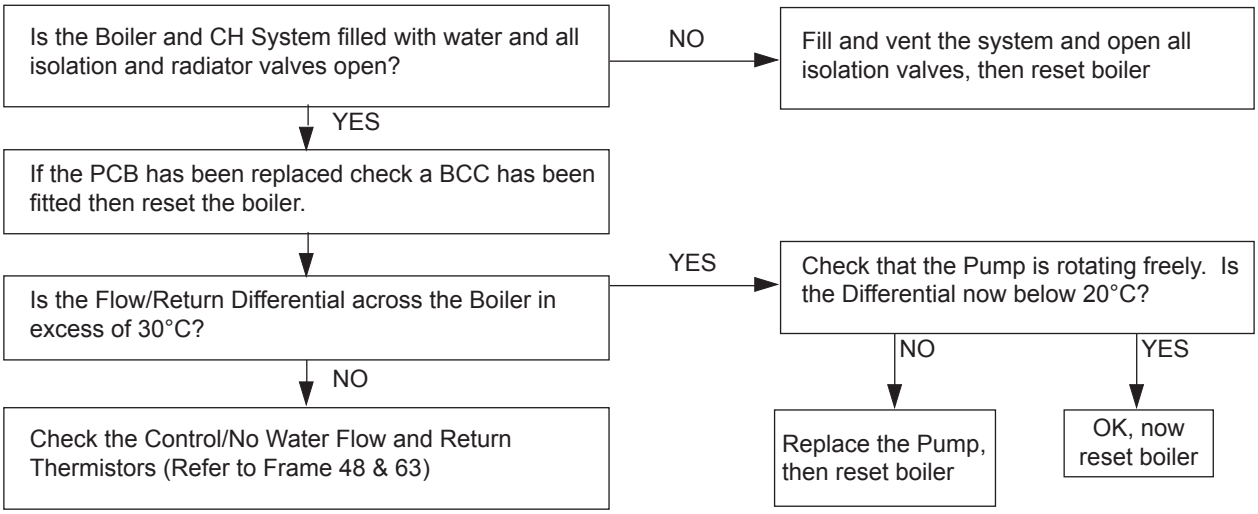
ALTERNATING 'L' and '1'	GO TO FRAME 68 - FLOW TEMPERATURE OVERHEAT LOCKOUT or NO WATER FLOW LOCKOUT
ALTERNATING 'L' and '2'	GO TO FRAME 69 - IGNITION LOCKOUT
ALTERNATING 'L' and '5'	5 RESETS WITHIN 15 MINS - TURN POWER OFF AND ON
ALTERNATING 'L' and '6'	GO TO FRAME 70 - FALSE FLAME LOCKOUT
ALTERNATING 'F' and '0'	BCC (BOILER CHIP CARD) NOT FITTED SEE FRAME 55
ALTERNATING 'F' and '1'	GO TO FRAME 71 - LOW WATER PRESSURE
ALTERNATING 'F' and '2'	GO TO FRAME 72 - FLAME LOSS
ALTERNATING 'F' and '3'	GO TO FRAME 73 - FAN FAULT
ALTERNATING 'F' and '4'	GO TO FRAME 74 - CONTROL/NO FLOW THERMISTOR FAULT
ALTERNATING 'F' and '5'	GO TO FRAME 75 - RETURN THERMISTOR FAULT
ALTERNATING 'F' and '6'	GO TO FRAME 76 - OUTSIDE SENSOR FAULT
ALTERNATING 'F' and '7'	LOW MAINS VOLTAGE - CONTACT ELECTRICITY PROVIDER
ALTERNATING 'F' and '9'	PCB FAULT - **REPLACE PCB
ALTERNATING 'c' and '2'	GO TO FRAME 77 - BCC FAULT (BOILER CHIP CARD)
ALTERNATING 'c' and '0'	RESET BOILER
NO CH	GO TO FRAME 78
NO HW	GO TO FRAME 80
CH & HW OPERATION REVERSED	CHECK SYSTEM CONTROLS WIRING TO BOILER SEE FRAME 28
NO DISPLAY	GO TO FRAME 79

Note that production boiler PCBs are factory pre-set to operate for boiler range and output, but when ordering Primary PCB as a spare, an additional Boiler Chip Card (BCC) MUST also be purchased for your specific boiler range and output.

**If PCB replaced as a spare ensure that the BCC (boiler chip card - small plastic part) is fitted to the PCB otherwise replace PCB.

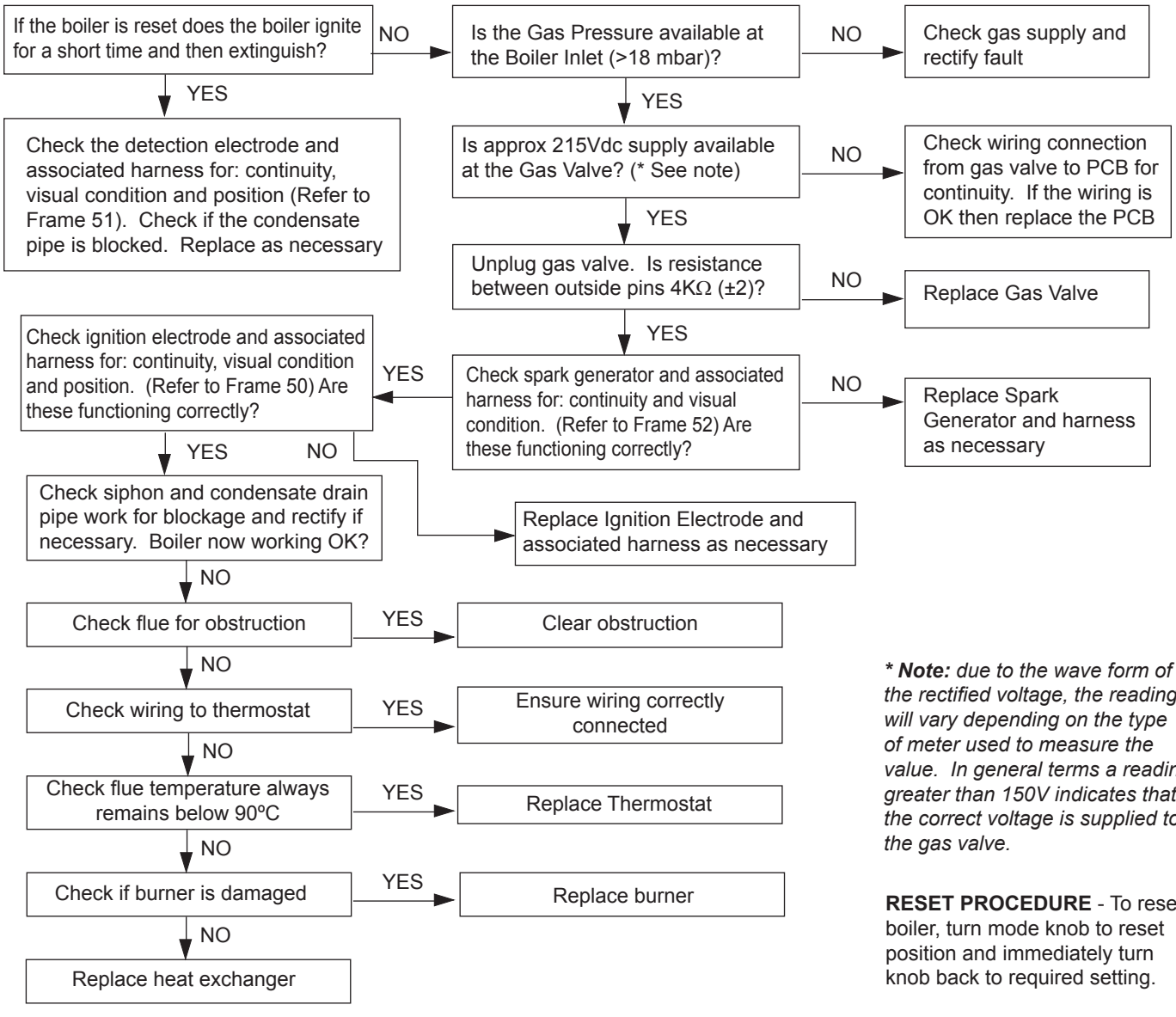
RESET PROCEDURE - To reset boiler, turn mode knob to reset position and immediately turn knob back to required setting.

68 ALTERNATING 'L' AND '1' - FLOW TEMPERATURE OVERHEAT LOCKOUT OR NO WATER FLOW LOCKOUT



RESET PROCEDURE - To reset boiler, turn mode knob to reset position and immediately turn knob back to required setting.

69 ALTERNATING 'L' AND '2' - IGNITION LOCKOUT



** **Note:** due to the wave form of the rectified voltage, the reading will vary depending on the type of meter used to measure the value. In general terms a reading greater than 150V indicates that the correct voltage is supplied to the gas valve.*

RESET PROCEDURE - To reset boiler, turn mode knob to reset position and immediately turn knob back to required setting.

70 ALTERNATING 'L' AND '6' - FALSE FLAME LOCKOUT

Reset the boiler, does Boiler Work OK?

YES → Check routing and integrity of internal boiler wiring is OK. Check condition of Flame Sense Electrode and replace if deteriorated.

NO ↓

Separate the flame detection electrode in-line connector. Is there continuity between the terminals pins connected to the electrode?

YES → Replace Flame Detection Electrode

NO → Check routing and integrity of internal boiler wiring.

RESET PROCEDURE - To reset boiler, turn mode knob to reset position and immediately turn knob back to required setting.

71 ALTERNATING 'F' AND '1' - LOW WATER PRESSURE

Is the Boiler and CH System filled with water and all isolation and radiator valves open (check pressure gauge is between 1 to 1.5 bar)?

NO → Fill and vent the system and open all isolation valves

YES ↓

Are connections on water pressure sensor secure?

NO → Re-fit connections

YES → Replace water pressure sensor

72 ALTERNATING 'F' AND '2' - FLAME LOSS

Does the boiler ignite for a short time and then extinguish?

NO → Is the Gas Pressure available at the Boiler Inlet (18 mbar)?

NO → Check gas supply and rectify fault

YES ↓

Check the detection electrode and associated harness for: continuity, visual condition and position (Refer to Frame 51). Check if condensate pipe is blocked. Check if flue is blocked. Replace as necessary

YES ↓

Is 215Vdc supply available at the Gas Valve while the flame is on? (* See note)

NO → Check wiring from gas valve to PCB for continuity. If the wiring is OK then replace the PCB

YES ↓

Check spark generator and associated harness for: continuity and visual condition. (Refer to Frame 52) Are these functioning correctly?

NO → Replace Spark Generator and Harness as necessary.

YES ↓

Check ignition electrode and associated harness for: continuity, visual condition and position. (Refer to Frame 56) Are these functioning correctly?

NO → Replace Ignition Electrode and associated harness as necessary

YES ↑

Check siphon and condensate drain pipe work for blockage and rectify if necessary. Boiler now working OK?

NO ↓

Check flue for obstruction

YES → Clear obstruction

NO ↓

Check wiring to thermostat

YES → Ensure wiring correctly connected

NO ↓

Check flue temperature always remains below 90ºC

YES → Replace Thermostat

NO ↓

Check if burner is damaged

YES → Replace Burner

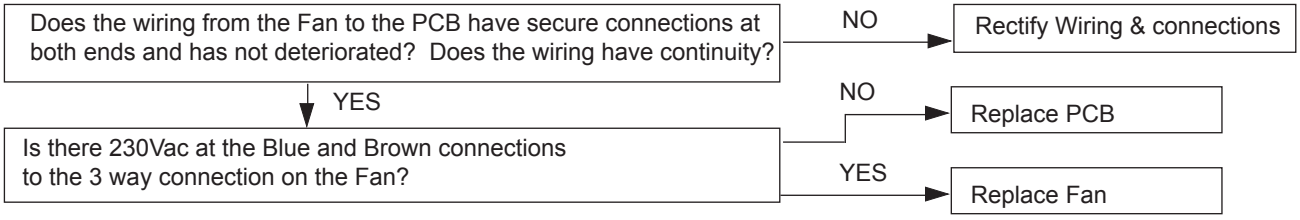
NO ↓

Replace heat exchanger

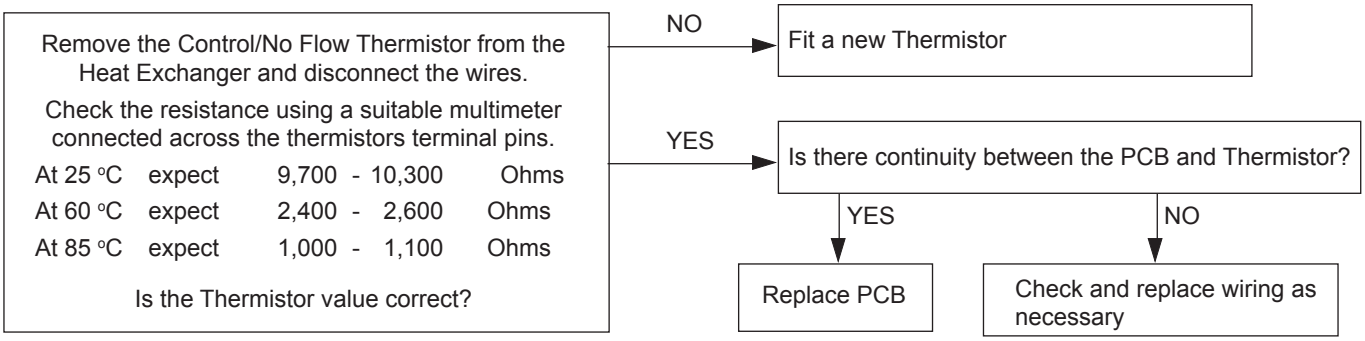
YES → Replace Gas Valve

*** Note:** *due to the wave form of the rectified voltage, the reading will vary depending on the type of meter used to measure the value. In general terms a reading greater than 150V indicates that the correct voltage is supplied to the gas valve.*

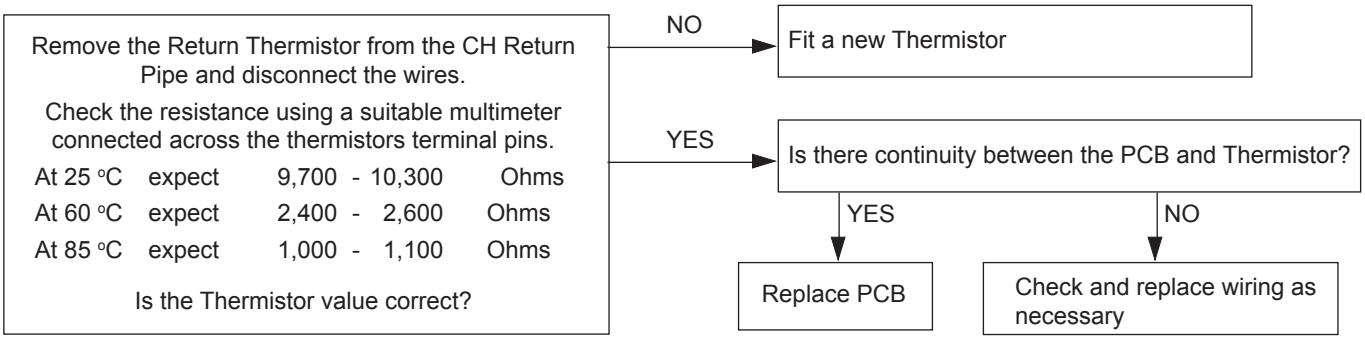
73 ALTERNATING ‘F’ AND ‘3’ - FAN FAULT



74 ALTERNATING ‘F’ AND ‘4’ - CONTROL / NO FLOW THERMISTOR FAULT



75 ALTERNATING ‘F’ AND ‘5’ - RETURN THERMISTOR FAULT



76 ALTERNATING 'F' AND '6' - OUTSIDE SENSOR FAULT

Is the wiring securely connected at both the boiler and Outside Sensor?

NO → Securely connect the wiring at both the boiler and Outside Sensor

YES ↓

Disconnect the wires to the outside sensor.

Check the resistance using a suitable multimeter connected across the Outside Sensors terminal pins.

At 0 °C	expect	31,000 - 35,000	Ohms
At 15 °C	expect	15,000 - 16,500	Ohms
At 30 °C	expect	7,700 - 8,500	Ohms

Is the Outside Sensor value correct?

NO → Fit a new Outside Sensor

YES → Is the wiring securely connected between the incoming terminal block boiler connection of the Outside Sensor and the PCB?

YES → Replace PCB

NO → Securely connect the wiring at the Terminal Block and the PCB

77 ALTERNATING 'c' AND '2' - BCC FAULT (BOILER CHIP CARD)

Is the correct BCC for the boiler securely inserted into the slot at the front left of the PCB? (identified by the label on the BCC)

NO → Securely insert the correct BCC for the boiler into the PCB and after switching power on and 'c0' being shown, reset boiler.

Note. Ensure the correct orientation of BCC by placing "TOP" side up.

YES ↓

Replace the BCC with a new BCC (that is correct for the boiler). After switching power on and 'c0' being shown, press reset. Is 'c2' still shown?

YES → Replace PCB

RESET PROCEDURE - To reset boiler, turn mode knob to reset position and immediately turn knob back to required setting.

78 NO CH OPERATION

Is the mode knob in the ON position?

NO → Move the mode knob to the ON position

YES ↓

Are the Timer and the Room Thermostat or cylinder thermostat switched on?

NO → Switch the Timer, Room Stat and Cylinder Stat On

YES ↓

Are the Radiator Valves Open?

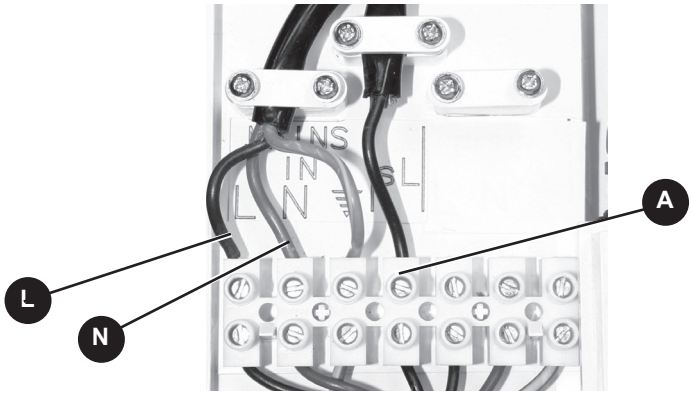
NO → Open the Radiator Valves

YES ↓

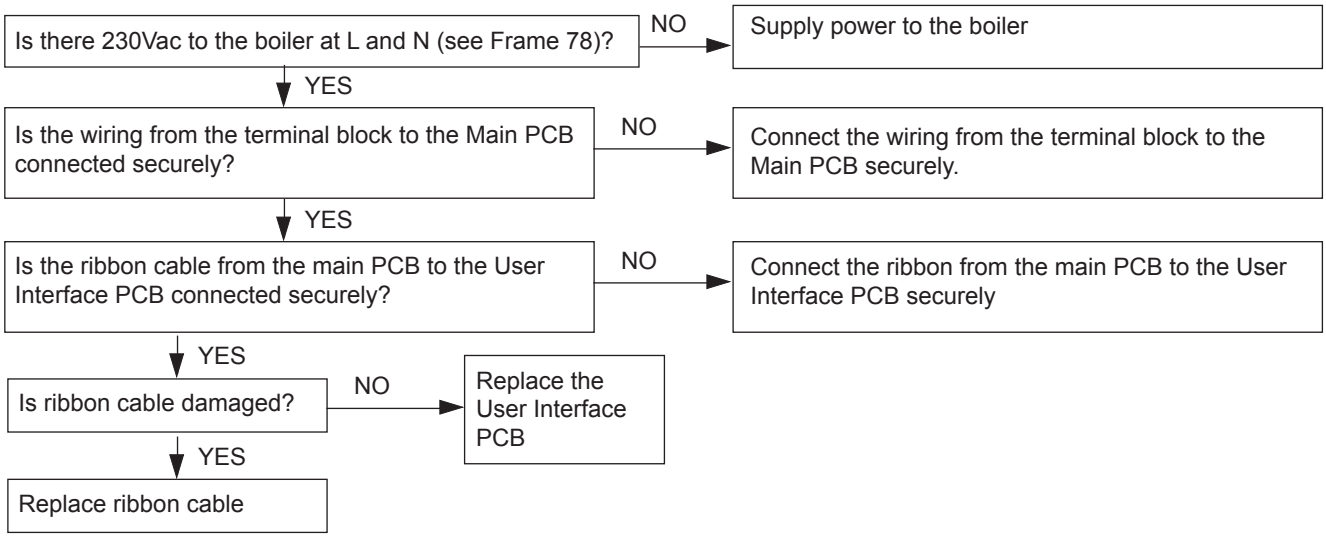
Is there 230Vac at (A)?

YES → Check wiring from terminal strip to PCB.

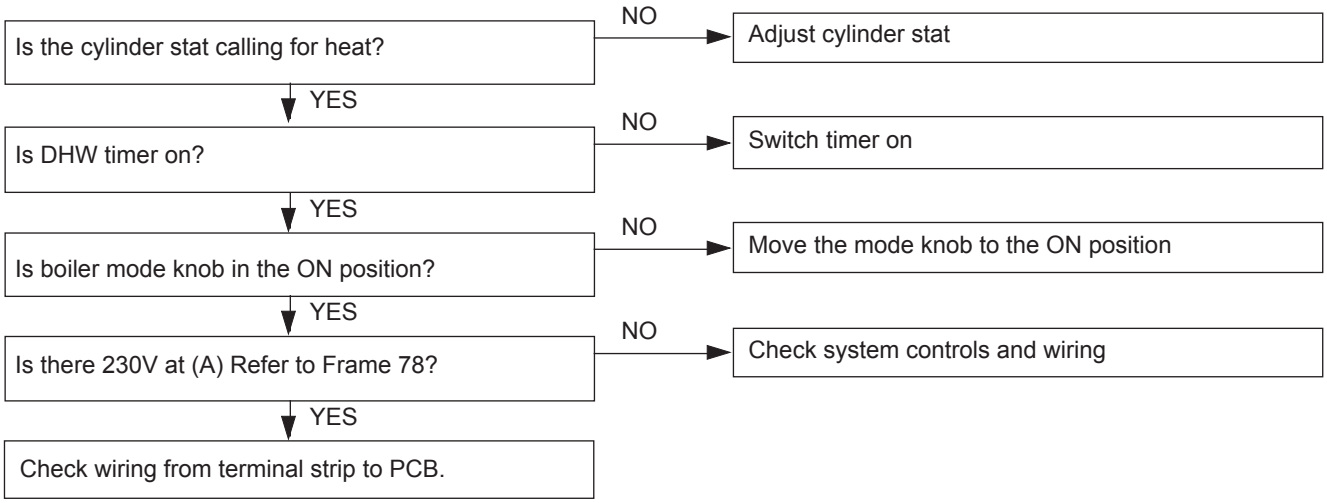
NO → There is no Voltage from the Timer/Room Stat. This is not boiler fault. Ensure Voltage is supplied to boiler by rectifying external wiring.



79 NO DISPLAY



80 NO HW



SHORT LIST OF PARTS

When replacing any part on this appliance use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by Keston. Failure to do so could affect safety or performance of this appliance.

Our Parts team are also available to help with your Keston Spare Parts enquiries on 01482 498665.

When calling, and to ensure we can provide you with the most accurate parts information, please ensure you have the following to hand;

- Boiler Model
- Appliance GC Number
- Boiler Serial Number

NOTES

BACK

Code Of Practice

For the installation, commissioning and servicing of domestic heating and hot water products

Benchmark places responsibilities on both manufacturers and installers.* The purpose is to ensure that customers** are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. Installers are required to carry out work in accordance with the following:

Standards of Work

- Be competent and qualified to undertake the work required.
- Install, commission, service and use products in accordance with the manufacturer's instructions provided.
- Ensure that where there is responsibility for design work, the installation is correctly sized and fit for purpose.
- Meet the requirements of the appropriate Building Regulations. Where this involves notifiable work be a member of a Competent Persons Scheme or confirm that the customer has notified Local Authority Building Control (LABC), prior to work commencing.
- Complete all relevant sections of the Benchmark Checklist/Service Record when carrying out commissioning or servicing of a product or system.
- Ensure that the product or system is left in a safe condition and, whenever possible, in good working order.
- Highlight to the customer any remedial or improvement work identified during the course of commissioning or servicing work.
- Refer to the manufacturer's helpline where assistance is needed.
- Report product faults and concerns to the manufacturer in a timely manner.

Customer Service

- Show the customer any identity card that is relevant to the work being carried out prior to commencement or on request.
- Give a full and clear explanation/demonstration of the product or system and its operation to the customer.
- Hand over the manufacturer's instructions, including the Benchmark Checklist, to the customer on completion of an installation.
- Obtain the customer's signature, on the Benchmark Checklist, to confirm satisfactory demonstration and receipt of manufacturer's instructions.
- Advise the customer that regular product servicing is needed, in line with manufacturers' recommendations, to ensure that safety and efficiency is maintained.
- Respond promptly to calls from a customer following completion of work, providing advice and assistance by phone and, if necessary, visiting the customer.
- Rectify any installation problems at no cost to the customer during the installer's guarantee period.

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THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

*The use of the word "installer" is not limited to installation itself and covers those carrying out installation, commissioning and/or servicing of heating and hot water products, or the use of supporting products (such as water treatment or test equipment).
**Customer includes householders, landlords and tenants.

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GAS BOILER SYSTEM COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the boiler as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission according to the manufacturer's instructions and complete this Benchmark Commissioning Checklist will invalidate the warranty. This does not affect he customer's statutory rights.

Customer Name _____ Telephone Number _____

Address _____

Boiler Make and Model _____

Boiler Serial Number _____

Commissioned by *(print name)* _____ Gas Safe Register Number _____

Company Name _____ Telephone Number _____

_____

_____ Commissioning Date _____

To be completed by the customer on receipt of a Building Regulations Compliance Certicate *:

Building Regulations Notification Number *(if applicable)*

CONTROLS Tick the appropriate boxes

Time and Temperature Control to Heating	Room Thermostat and Programmer/Timer ☐	Programmable Room Thermostat ☐	Load/Weather Compensation ☐	Optimum Start Control ☐			
Time and Temperature Control to Hot Water	Cylinder Thermostat and Programmer/Timer ☐			Combination Boiler ☐			
Heating Zone Valves	Fitted ☐			Not Required ☐			
Hot Water Zone Valves	Fitted ☐			Not Required ☐			
Thermostatic Radiator Valves	Fitted ☐			Not Required ☐			
Automatic Bypass to System	Fitted ☐			Not Required ☐			
Boiler Interlock				Provided ☐			

ALL SYSTEMS

The system has been flushed and cleaned in accordance with BS7593 and boiler manufacturer's instructions Yes ☐

What system cleaner was used?

What inhibitor was used? Quantity _____ *litres*

CENTRAL HEATING MODE Measure and Record:

Gas Rate _____ m^3/hr OR _____ ft^3/hr

Burner Operating Pressure (if applicable) _____ mbar OR Gas Inlet Pressure _____ mbar

Central Heating Flow Temperature _____ *°C*

Central Heating Return Temperature _____ *°C*

COMBINATION BOILERS ONLY

Is the installation in a hard water area (above 200ppm)? Yes ☐ No ☐

If yes, and if required by the manufacturer, has a water scale reducer been fitted? Yes ☐ No ☐

What type of scale reducer has been fitted?

DOMESTIC HOT WATER MODE Measure and Record:

Gas Rate _____ m^3/hr OR _____ ft^3/hr

Burner Operating Pressure (at maximum rate) _____ mbar OR Gas Inlet Pressure (at maxiumum rate) _____ mbar

Cold Water Inlet Temperature _____ *°C*

Hot water has been checked at all outlets Yes ☐ Temperature _____ *°C*

Water Flow Rate _____ *l/min*

CONDENSING BOILERS ONLY

The condensate drain has been installed in accordance with the manufacturer's instructions and/or BS5546/BS6798 Yes ☐

If the condensate pipe terminates externally has the pipe diameter been increased and weatherproof insulation fitted? Yes ☐

ALL INSTALLATIONS

If required by the manufacturer, record the following CO_2 _____ % OR CO _____ *ppm* OR CO/CO_2 Ratio _____

The heating and hot water system complies with the appropriate Building Regulations Yes ☐

The boiler and associated products have been installed and commissioned in accordance with the manufacturer's instructions Yes ☐

The operation of the boiler and system controls have been demonstrated to and understood by the customer Yes ☐

The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer Yes ☐

Commissioning Engineer's Signature

Customer's Signature

(To confirm satisfactory demonstration and receipt of manufacturer's literature)

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

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SERVICE RECORD

It is recommended that your heating system is serviced regularly and that the appropriate Service Record is completed.

Service Provider
Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Always use the manufacturer's specified spare part when replacing controls.

SERVICE 1 Date

Engineer Name

Company Name

Telephone Number

Gas Safe Register Number

Comments

Signature

SERVICE 2 Date

Engineer Name

Company Name

Telephone Number

Gas Safe Register Number

Comments

Signature

SERVICE 3 Date

Engineer Name

Company Name

Telephone Number

Gas Safe Register Number

Comments

Signature

SERVICE 4 Date

Engineer Name

Company Name

Telephone Number

Gas Safe Register Number

Comments

Signature

SERVICE 5 Date

Engineer Name

Company Name

Telephone Number

Gas Safe Register Number

Comments

Signature

SERVICE 6 Date

Engineer Name

Company Name

Telephone Number

Gas Safe Register Number

Comments

Signature

SERVICE 7 Date

Engineer Name

Company Name

Telephone Number

Gas Safe Register Number

Comments

Signature

SERVICE 8 Date

Engineer Name

Company Name

Telephone Number

Gas Safe Register Number

Comments

Signature

SERVICE 9 Date

Engineer Name

Company Name

Telephone Number

Gas Safe Register Number

Comments

Signature

SERVICE 10 Date

Engineer Name

Company Name

Telephone Number

Gas Safe Register Number

Comments

Signature

BACK

Keston Heating, PO Box 103, National Avenue, Kingston Upon Hull, HU5 4JN
Tel. +44 (0) 1482 443005 Fax. +44 (0) 1482 467133. www.keston.co.uk

November 2012 UIN 208893 A01

Keston

Keston pursues a policy of continuing improvement in the design and performance of its products. The right is therefore reserved to vary specification without notice.

BACK

System 30

User Instructions

FAN POWERED HIGH EFFICIENCY
MODULATING DOMESTIC CONDENSING
GAS COMBINATION BOILER

CE/PI No. 86-CL-08
System 30 - GC No. 41-930-39

CE

These instructions must be left either with the user or next to the site gas meter.

Keston Heating
PO Box 103, National Avenue, Kingston Upon Hull, HU5 4JN
Tel. +44 (0) 1482 443005 Fax. +44 (0) 1482 467133
email : info@keston.co.uk web : www.keston.co.uk

COMPLIANT WITH BUILDING REGULATION PART L1 & L2

SEDBUK A RATED

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FOR ANY QUERIES PLEASE RING THE KESTON CONSUMER HELPLINE : 01482 443005

NOTE. BOILER RESET PROCEDURE -
To reset boiler, turn mode control knob to reset position and immediately turn knob back to required setting.

Introduction

The **Keston System** is a wall mounted, room sealed, condensing system boiler, featuring full sequence automatic spark ignition and fan assisted combustion.

Due to the high efficiency of the boiler, condensate is produced from the flue gases and this is drained to a suitable disposal point through a plastic waste pipe at the base of the boiler. A condensate 'plume' will also be visible at the flue terminal.

Safety

Current Gas Safety (Installation & Use) Regulations or rules in force.

In your own interest, and that of safety, it is the law that this boiler must be installed by a Gas Safe Registered Engineer, in accordance with the above regulations.

In IE, the installation must be carried out by a Registered Gas Installer (RGII) and installed in accordance with the current edition of I.S. 813 "Domestic Gas Installations", the current Building Regulations and reference should be made to the current ETCI rules for electrical installation.

It is essential that the instructions in this booklet are strictly followed, for safe and economical operation of the boiler.

Electricity Supply

This appliance must be earthed.

Supply: 230 V ~ 50 Hz. The fusing should be 3A.

Important Notes

- This appliance must not be operated without the casing correctly fitted and forming an adequate seal.
- If the boiler is installed in a compartment then the compartment MUST NOT be used for storage purposes.
- If it is known or suspected that a fault exists on the boiler then it MUST NOT BE USED until the fault has been corrected by a Gas Safe Registered Engineer or in IE a Registered Gas Installer (RGII).
- Under NO circumstances should any of the sealed components on this appliance be used incorrectly or tampered with.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instructions concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.

In cases of repeated or continuous shutdown a Gas Safe Registered Engineer or in IE a Registered Gas Installer (RGII) should be called to investigate and rectify the condition causing this and carry out an operational test. Only the manufacturers original parts should be used for replacement.

Minimum Clearances

Clearances of **165mm (6 1/2"**) above, **100mm (4"**) below, **2.5mm (1/8"**) at the sides and **450mm (17 3/4**") at the front of the boiler casing must be allowed for servicing.

Bottom clearance

Bottom clearance after installation can be reduced to 5mm.

This must be obtained with an easily removable panel, to enable the consumer to view the system pressure gauge, and to provide the 100mm clearance required for servicing.

To light the boiler. Refer to Frame 1

If a programmer is fitted refer to separate instructions for the programmer before continuing.

1. CHECK THAT THE ELECTRICITY SUPPLY TO BOILER IS OFF.
2. Set the mode control knob (B) to 'Off'.
3. Set the Central Heating temperature control (A) to 'max'.
4. Switch ON electricity to the boiler and check that all external controls, e.g. programmer and room thermostat, are ON.
5. Set the mode control knob to ON.

The boiler will commence the ignition sequence supplying heat to the central heating, if required.

Note. *In normal operation the boiler status display (C) will show codes:*

Standby - no demand for heat.

Heat being supplied.

Boiler frost protection - boiler will fire if temperature is below 5 degrees C.

During normal operation the burner on indicator (D) will remain illuminated when the burner is lit.

Note: If the boiler fails to light after five attempts the fault code will be displayed.

RESET PROCEDURE

To reset boiler, turn the mode control knob (B) to reset position and immediately turn knob back to ON. The boiler will repeat the ignition sequence. If the boiler still fails to light consult a Gas Safe Registered Engineer or in IE a Registered Gas Installer (RGII).

All Gas Safe Register installers carry a Gas Safe Register ID card, and have a registration number. Both should be recorded in the Benchmark Commissioning Checklist. You can check your installer by calling Gas Safe Register direct on 0800 4085500.

Keston is a member of the Benchmark scheme and fully supports the aims of the programme. Benchmark has been introduced to improve the standards of installation and commissioning of central heating systems in the UK and to encourage the regular servicing of all central heating systems to ensure safety and efficiency.

THE BENCHMARK SERVICE INTERVAL RECORD MUST BE COMPLETED AFTER EACH SERVIC

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Operation

***Note**. The pump will operate briefly as a self-check once every 24 hours, regardless of system demand.*

Control of water temperature

The boiler controls the central heating radiator temperature to a maximum of 80°C, adjustable via the CH temperature control (A) or is automatically set by the weather compensation device provided, the potentiometer adjusts the heating slope.

The Keston System is a high efficiency condensing boiler which is most efficient when operating in condensing mode.

The boiler will operate in this mode if the CH temperature control (A) is set to the 'e' position (economy mode). This control should be set to maximum for very cold periods

To shut down the boiler

Set the mode control knob to OFF.

To relight the boiler

Repeat the procedure detailed in 'To light the boiler'.

Frost protection

If no system frost protection is provided and frost is likely during a short absence from home, leave the heating controls (if fitted) at a reduced temperature setting. For longer periods, the entire system should be drained.

If the system includes a frost thermostat then, during cold weather, the boiler should be turned OFF at the time switch (if fitted) ONLY. The mains supply should be left switched ON, with the boiler thermostat left in the normal running position.

Boiler Overheat Protection

The boiler controls will shut down the boiler in the event of overheating. Should this occur, a fault code L-1 will be displayed.

Refer to fault chart.

Flame Failure

Should this occur a fault code L-2 will be displayed. Refer to fault chart.

Loss of system water pressure

The gauge (E) indicates the central heating system pressure. If the pressure is seen to fall below the original installation pressure of 1-2 bar over a period of time then a water leak may be indicated. In this event conduct the re-pressurising procedure as follows:

Re-pressurise via the filling loop to 1 bar (if unsure contact your installer), turn off the tap on the filling loop and turn switch (B) to the reset position and then back on again to reset the boiler.

If unable to do so or if the pressure continues to drop after filling a Gas Safe Registered Engineer or in IE a Registered Gas Installer (RGII) should be consulted.

NOTE. THE BOILER WILL NOT OPERATE IF PRESSURE HAS REDUCED TO LESS THAN 0.3 BAR UNDER THIS CONDITION.

Condensate Drain

The condensate drain (F) must not be modified or blocked.

Blockage of the condensate drain, caused by debris or freezing, can cause automatic shutdown of the boiler.

If freezing is suspected and the pipe run is accessible an attempt may be made to free the obstruction by pouring hot water over the exposed pipe and clearing any blockage from the end of the pipe. If this fails to remedy the problem the assistance of a Gas Safe Registered Engineer or in IE a Registered Gas Installer (RGII)

should be sought.

Escape of gas

Should a gas leak or fault be suspected contact the National Gas Emergency Service without delay. **Telephone 0800 111 999**

Do NOT search for gas leaks with a naked flame.

Cleaning

For normal cleaning simply dust with a dry cloth.

To remove stubborn marks and stains, wipe with a damp cloth and finish off with a dry cloth.

DO NOT use abrasive cleaning materials.

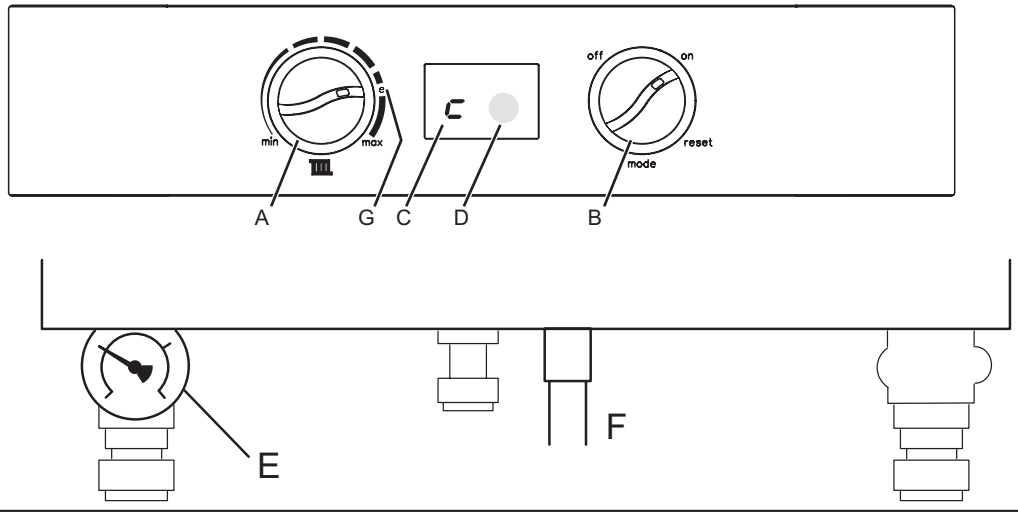
Maintenance

The appliance should be serviced at least once a year by a Gas Safe Registered Engineer or in IE a Registered Gas Installer (RGII).

1 BOILER CONTROLS

Legend

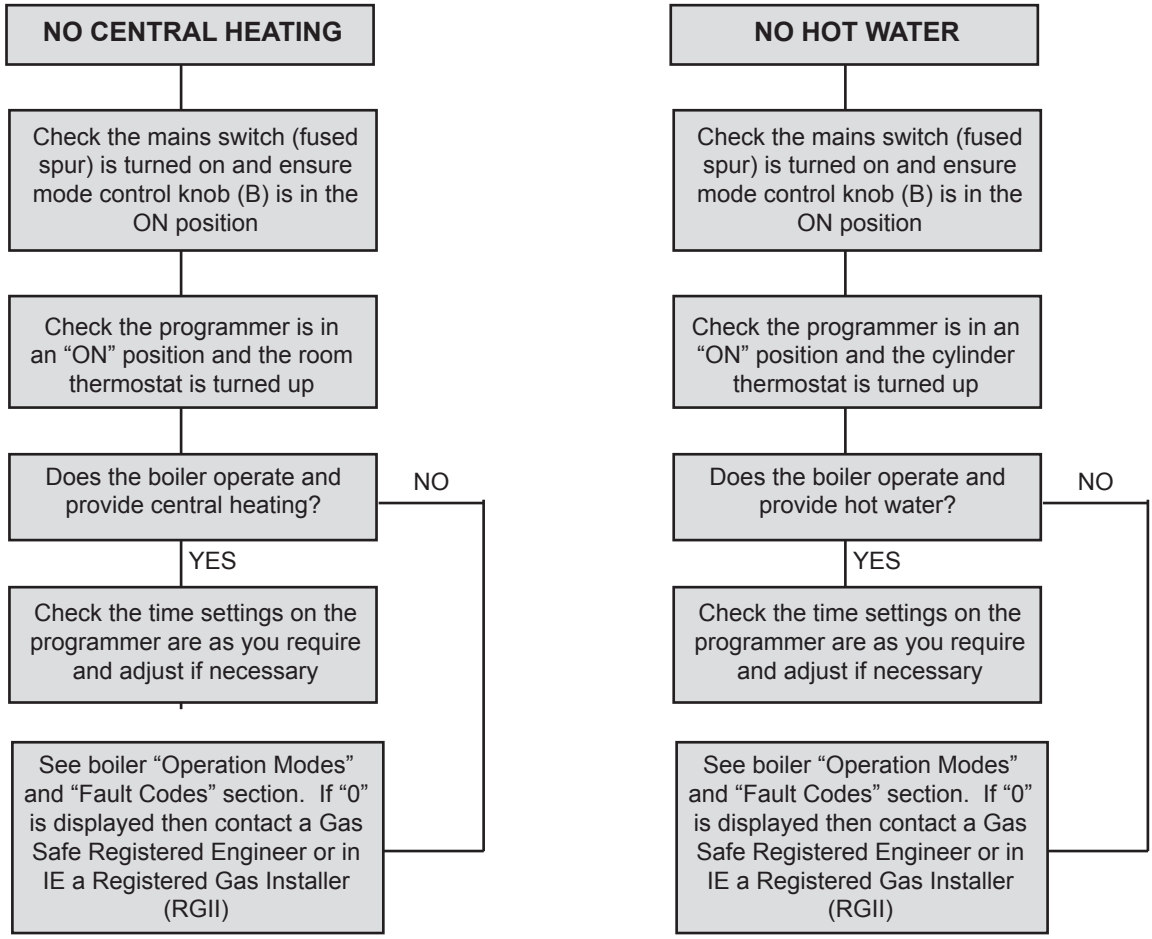
A. CH Temperature Control
B. Mode Control
C. Boiler Status
D. Burner 'on' Indicator
E. Pressure Gauge
F. Condensate Drain
G. Economy Mode



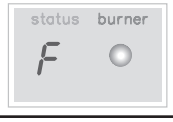
POINTS FOR THE BOILER USER

Note. *In line with our current warranty policy we would ask that you check through the following guide to identify any problems external to the boiler prior to requesting a service engineers visit. Should the problem be found to be other than with the appliance we reserve the right to levy a charge for the visit, or for any pre-arranged visit where access is not gained by the engineer.*

TROUBLESHOOTING



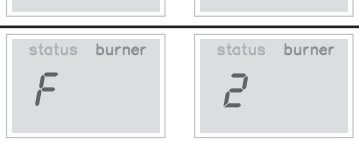
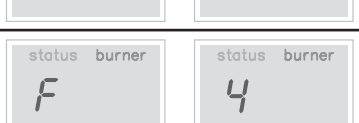
OPERATION MODES

DISPLAY CODE ON BOILER	DESCRIPTION
	The boiler is in standby mode awaiting either a central heating call or hot water demand.
	The boiler has a call for central heating / hot water but the appliance has reached the desired temperature set on the boiler.
	The boiler is operating for central heating / hot water.
	The boiler is operating in frost mode.

continued . . . . . .

BACK

FAULT CODES

DISPLAY CODE ON BOILER	DESCRIPTION	ACTION
	Boiler Chip Card (BCC) Not Fitted	Please contact Keston (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
	Outside Sensor Failure	Reset the appliance - if the boiler fails to operate then please contact Keston (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
	Low Mains Voltage	Contact a qualified electrician or your electricity provider.
	PCB Fault	PCB Fault. Please contact Keston (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
	5 Boiler Resets in 15 minutes	1. Turn power off and on at the fused spur. 2. If the boiler fails to operate please contact Keston (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
	False Flame Lockout	Reset the appliance - if the boiler fails to operate then please contact Keston (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
	BCC Activation Fault	Reset the appliance - if the boiler fails to operate then please contact Keston (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
	BCC Fault	
	Low Water Pressure	Check system pressure is between 1 & 1.5bar on the pressure gauge. If the boiler fails to operate then please contact Keston (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
	Flow Temperature Overheat	
	Flame Loss	1. Check other gas appliances in the house are working to confirm a supply is present in the property. 2. If other appliances do not work or there are no other appliances, check the gas supply is on at the meter and/or pre payment meter has credit. If the boiler fails to operate then please contact Keston (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
	Fan Fault	Reset the appliance - if the boiler fails to operate then please contact Keston (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
	Control / No Flow Thermistor	Reset the appliance - if the boiler fails to operate then please contact Keston (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).
	Return Thermistor	Reset the appliance - if the boiler fails to operate then please contact Keston (if under warranty) or alternatively a Gas Safe Registered Engineer if outside of the warranty period. In IE contact a Registered Gas Installer (RGII).

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Keston pursues a policy of continuing improvement in the design and performance of its products. The right is therefore reserved to vary specification without notice.